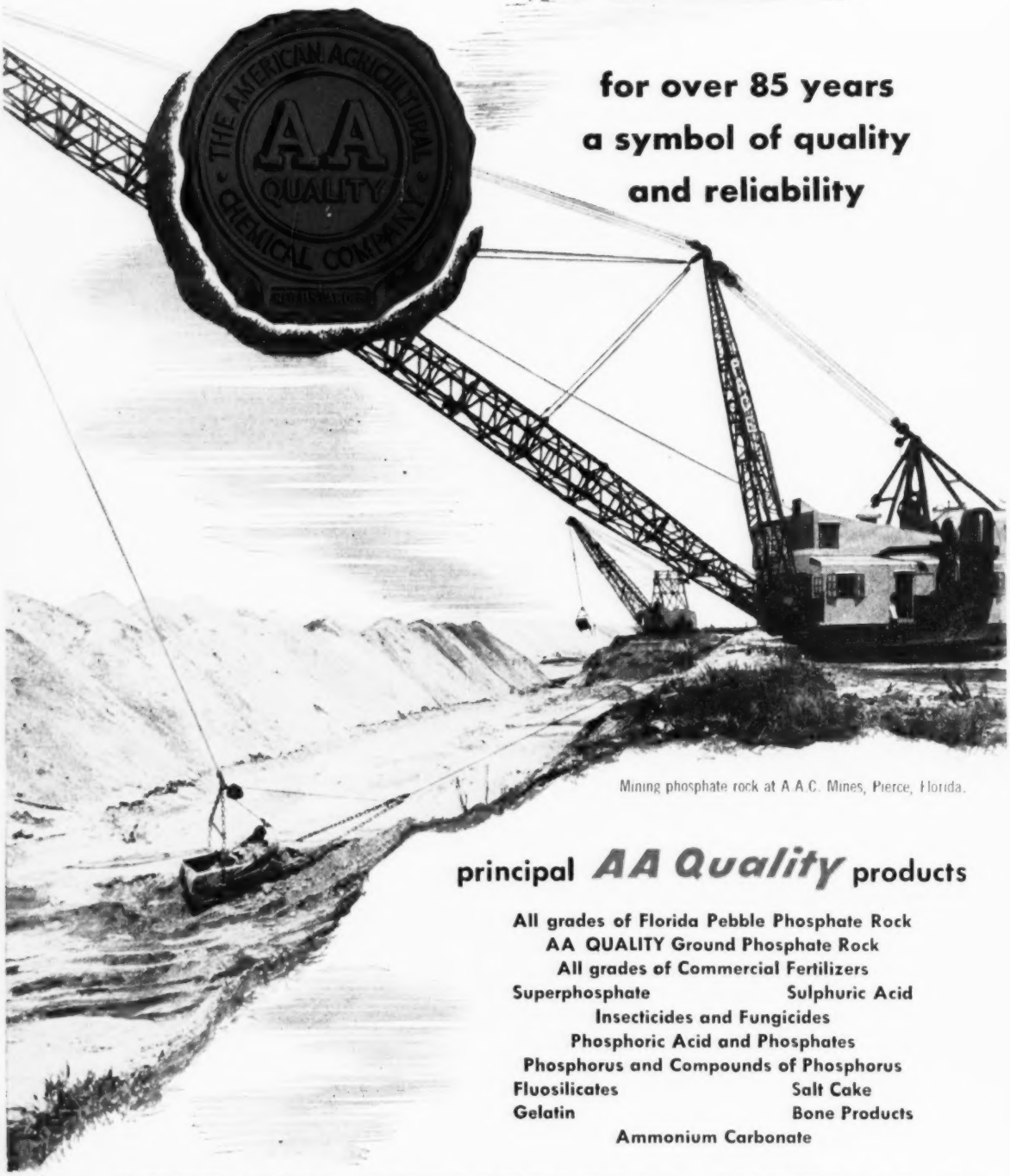
COMMERCIAL FERTILIZER

CONSOLIDATED WITH THE FERTILIZER GREEN BOOK

JANUARY, 1953

AA Quality...



for over 85 years
a symbol of quality
and reliability

Mining phosphate rock at A.A.C. Mines, Pierce, Florida.

principal *AA Quality* products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Commercial Fertilizers
Superphosphate — Sulphuric Acid
Insecticides and Fungicides
Phosphoric Acid and Phosphates
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Gelatin — Bone Products
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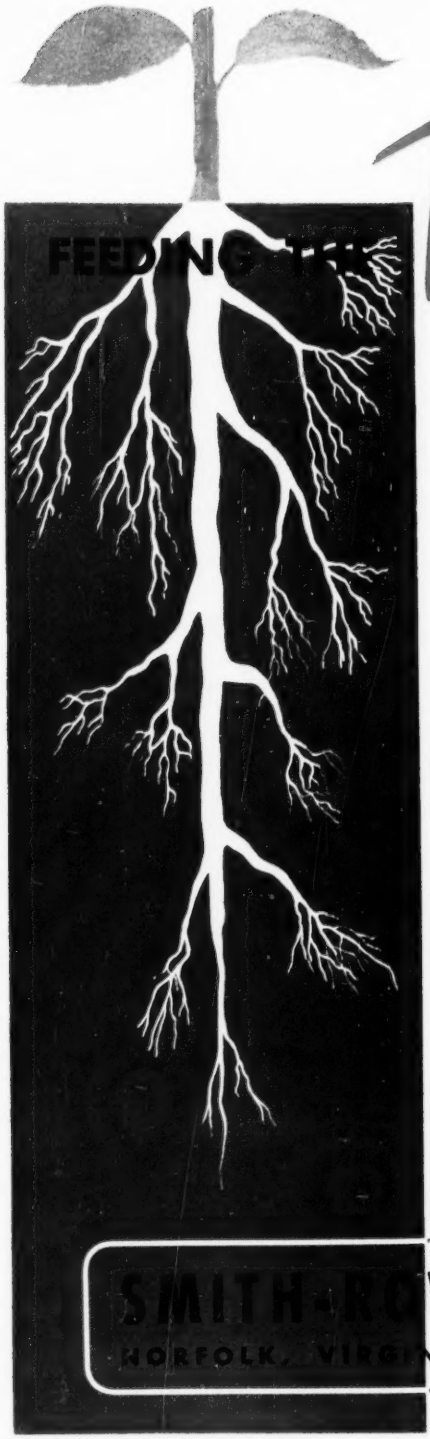
The AMERICAN AGRICULTURAL CHEMICAL Co.

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U. S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE



FEEDING THE Taproot OF SUCCESS...

Just as *quality* in the fertilizers you manufacture assures growth for the farmers' crops, just as surely does that reputation for *quality* assure growth for the manufacturers' business. For the very taproot of success in any business is the insistence upon quality in the goods produced.

There is no higher quality source of nitrogen for your Fertilizers than SMIROW TANKAGE. It is 100% natural organic. It is 90% water insoluble and 90% available. SMIROW TANKAGE is always in perfect mechanical condition . . . another mark of quality. It is uniform both in color and in texture.

To feed this taproot of the successful growth of your operation see that correct proportions of SMIROW TANKAGE assure outstanding quality in your goods.

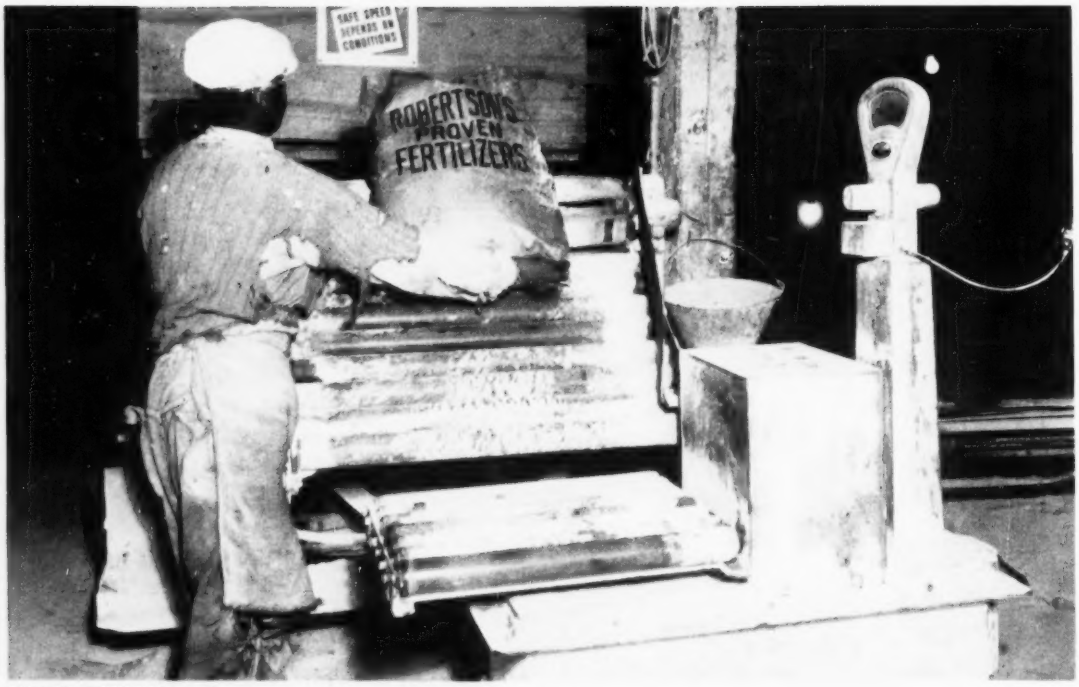
To help make your sales grow,
write for samples and prices.

SMIROW TANKAGE

MAKES PLANTS GROW

SMITH-ROWLAND COMPANY

NORFOLK, VIRGINIA • CHEMICAL, ILLINOIS



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Manual Fertilizer Packaging . . .

THERE IS NO SUBSTITUTE FOR EXACT WEIGHT

While mechanization with fully automatic equipment is the desired packaging operation there are many products which cannot be so handled. This is due to diversity of products, volume involved, orders to be filled and lastly the type of the commodity. If you have products of this nature accept the facts. Solve your problem with skillful coordination of time and motion study of highly trained personnel and special production line equipment to fit the operation. From the equipment standpoint your efficiency can be materially increased with EXACT WEIGHT Scales for checking manually packaged bags. Today thousands of these famous scales are at work in this type of packaging. They are your best cost control measure in hand packaging operations. Write for unit scale details to fit your manual operations.

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in all Principal Cities
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ACCELERATED FERTILIZER CONDITIONING

With TENNESSEE'S

SUL-FON-ATE AA9!

Our own fertilizer plants have been experimenting with wetting agents to reduce curing time and prevent secondary caking of mixed fertilizers. **SUL-FON-ATE AA 9** has been found to be very effective in this application and it is now being regularly used by our plants.

Tennessee's **SUL-FON-ATE AA 9** is an alkyl aryl sulfonate containing 90% active ingredient. It is a powerful wetting and penetrating agent that promotes better contact between the fertilizer components. This intimate contact reduces the time required for completion of the reaction.

UNTREATED

TREATED

These pictures show the effect of the addition of Tennessee's **SUL-FON-ATE AA 9** to one of our more troublesome formulas. The nitrogen was all solution. Both samples were cured for 4 days and then bagged. The bags were stacked for 10 days and the above samples were taken from the bottom bags.

These and other tests have shown that 4 day's curing is sufficient and that stored bagged goods are much more resistant to caking when Tennessee's **SUL-FON-ATE AA 9** is used.

METHOD OF APPLICATION

Since manufacturing processes vary widely in fertilizer plants, the best method of introduction into the mixer must be determined at each plant. Our plants prefer to distribute it on the conveyor belt feeding into the mixer. In the pictures shown **SUL-FON-ATE AA 9** was added to the potash. It is not necessary to make any changes in operating procedure.

For further Information, please contact

ORGANIC CHEMICALS DIVISION

TENNESSEE TC TENNESSEE CORPORATION **CORPORATION**

617-29 Grant Building, Atlanta, Georgia

COMMERCIAL FERTILIZER

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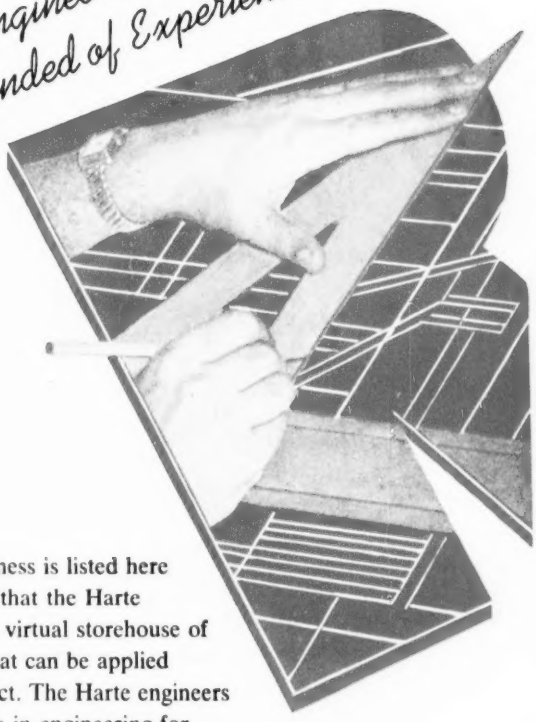
Which of these processes fits your need?

Engineering Compounded of Experience



- SINGLE SUPERPHOSPHATE PLANTS
- TRIPLE SUPERPHOSPHATE
- AMMONIUM SULPHATE PLANTS
- NITRIC ACID
- STORAGE BUILDINGS
- NITRIC ACID ACIDULATION
- NITROPHOSPHATE PLANTS
- INSECTICIDE PLANTS
- SULPHURIC ACID
- WAREHOUSES
- PHOSPHORIC ACID
- GRANULATION PLANTS
- FERTILIZER MIXING PLANTS

If your business is listed here you will find that the Harte System has a virtual storehouse of knowledge that can be applied to your project. The Harte engineers are specialists in engineering for the fertilizer industry. Specialists in visualization *and* application. Specialists in handling jobs quickly, economically and efficiently.

The diversified experience and knowledge of our engineers is available to you in planning the design and construction of a raw materials processing plant or a mixing plant. The Harte System can be applied on a specific immediate problem or on over-all broad-range planning. Whatever your fertilizer plant needs, the Harte organization can handle your complete job or any part, from original plans to finished operating plant.

In fertilizer plant planning there is no substitute for experience. Why not call in the Harte organization for a discussion of your plans? There is no obligation, of course.

John J. Harte Company

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CONSTRUCTION MANAGERS

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It's TOPS for corn rootworm control!

Get ready for the big demand

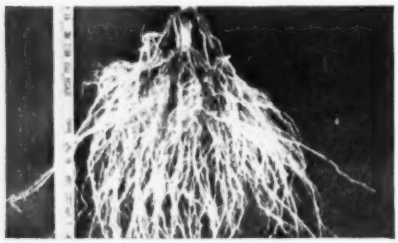
To KEEP one jump ahead of the corn rootworm—more and more farmers are using aldrin . . . a practical and potent killer of rootworm.

As demand for aldrin will continue to soar, a good supply on hand will show a fast turnover, with many additional re-orders. Make sure you have enough to keep up with the increased demand.

Aldrin can be applied to the soil by two easy methods. It can be mixed with starter fertilizer or it can be sprayed or dusted on the ground and harrowed in at time of planting.

For the latest technical information on formulation and methods for applying aldrin, write to the office nearest you.

These roots, photographed to the same scale, show: (above) a corn root from an untreated row, and (below) the healthy root from an adjacent aldrin-treated row.



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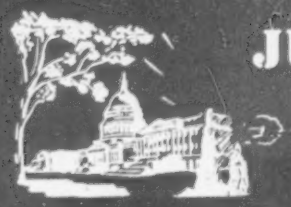

JUST AROUND THE CORNER

By Vernon Mount

Eisenhower makes sense. He will have a team in full working order by January 20, and it will be a practical, experienced and hard-working team. His party is reunited. Even the Southern Democrats seem ready to string along, maintaining the coalition which has kept us from socialism all these years.

Business is relieved. The budget-balancing program will be accomplished by stretching out the arms program, thus preventing a boom-and-bust. 180 billions have been made available for defense. 76 billions have been spent. That leaves a good cushion, without immediate drain on the Treasury. And with our new war industry a going, permanent concern, the employment it provides looks permanent for many years to come.

No radical changes are to be expected that will disturb the economic picture. Excess profits, ending June 30, will hardly be renewed, short of hot war. Individual taxes should come down next year. Some excises will come off later. And so on. Progressive lightening of taxes, paperwork and the psychological warfare between Government and Business.

Happy New Year to you all.

Yours faithfully,

Vernon Mount

The toughest three-letter word in business

"But . . ."

The word a man uses when he starts by nodding yes and ends by saying no.

"But . . ."

The word on a Multiwall buyer's tongue just after he's said, "Well, as long as we order by specification, I guess one brand's as good as another . . ."

Executives who purchase more than 85 per cent of all Multiwalls have a big BUT there.

They testify* that there are many other considerations. Among the most important, the reputation of the manufacturer. They judge him by his record of reliability, his effort to meet delivery dates, his willingness to give a full measure of service.

We welcome the challenge of the toughest three letter word in business. We believe the attention big buyers of Multiwalls pay to the *extra* factors—dependability, for instance—has a lot to do with their giving Union a greater proportion of their Multiwall business.

More so every day . . .

IT'S UNION FOR MULTIWALLS

TRADE MARK UNION

*August, 1951 research study.

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PHOSPHATE

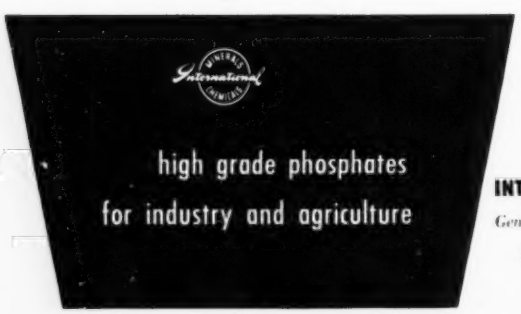
for the manufacture of industrial chemicals

PHOSPHATE

for the manufacture of complete fertilizers

PHOSPHATE

ground rock phosphate for direct application to the soil



phosphate division

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

Phosphate mines and plants in Florida at Noralyn, Peace Valley, Achan, Mulberry; in Tennessee at Mt. Pleasant and Wales.

CFA Phone Service Improved

California Fertilizer Association has finally received the rotary phone service ordered when they moved August 1, but not then available. Now they have two trunk lines, which ring in sequence when you call Los Angeles, Pyramid 1-1107.

NFA Urges Local Corn Data

National Fertilizer Association points out that their new movie, "Cash in on Corn" does not give all the instructions necessary to fit every local area. They are strongly urging those who show the picture to farmers to get local corn growing instructions from their own Land Grant Colleges to be passed out after the showing to those who have viewed the picture. Many colleges have already prepared statements specifically designed for "Cash in on Corn" viewers.

Coleman Says Southern Farmers Need Help

"In order to keep their operations on a profitable basis, more southern farmers will be dependent on country bankers in 1953 than in 1952," says Russell Coleman, NFA President. "Unfavorable weather in the South in 1952 impaired many farmers' financial positions. Furthermore, the outlook is for prices of farm crops to be slightly lower and those of farm supplies a little higher. So southern farmers are faced with a price-cost squeeze just when they can least afford it. They can beat this squeeze by cutting production costs through higher yields.

"Throughout the South agricultural economists have shown that when a farmer steps up his yields by using modern farm practices he cuts his unit costs of production. To make low-cost high yields, the farmer needs adequate working capital. This year many farmers will be dependent on their bankers for this capital. It is good business for farmers to use more fertilizer in accordance with the recommendations of their State College of Agriculture. It's good business for his banker, the rural business man and the whole agricultural community.

It Seems to Me

by BRUCE MORAN

"We are the envy of the world" the man said on TV. He might have added we are also the creditors of the world, and the dolers out of charity to the world—and have been for a generation or more.

Do you like those you envy . . . those to whom you owe money . . . those who hand down gifts to you? Neither do the citizens of the world who are envious of us.

The way I see it, the biggest thing we can do—now that the do-gooders are to be purged from our political scene—is cure that envy: get the rest of the world on a basis where it needs no charity.

Only that way can there be peace.

We of Commercial Fertilizer look forward every year to the Christmas cards that come to us from friendly, thoughtful people in the industry. We wish we could acknowledge every one of them in person, but we must take this means to thank all of you and to wish each of you a very, very

HAPPY NEW YEAR!

INDUSTRY CALENDAR

Date	Organization	Hotel	City	State
Jan. 7	Ky's Green	Seelbach	Louisville	Ky.
Jan. 15	S. C. Conference	Wade Hampton	Columbia	S. C.
Jan. 17	Defoliation	Peabody	Memphis	Tenn.
Jan. 20	Ga. PFES	U of Ga.	Athens	Ga.
Jan. 21	Ga. Sect., ASA	U of Ga.	Athens	Ga.
Feb. 9-11	So. Ag. Workers	Jung	New Orleans	La.
March 1	Sou. Safety Sec.	Biltmore	Atlanta	Ga.
Mar. 11-13	NAC	Jung	New Orleans	La.
June 11-14	APFC	Homestead	Hot Springs	Va.
June 15-17	NFA	Greenbrier	White Sulphur,	W. Va.
July	Canadian	Algonquin	St. Andrews	N. B.

Calmonite

AMMONIUM NITRATE-LIME

20.5% NITROGEN

2 FERTILIZERS IN 1
Contains 10.25% quick-acting *nitrate* nitrogen.
Contains 10.25% longer-lasting *ammonia* nitrogen.

GREEN PELLETS READY TO USE
Sized for flow and ease of application in broadcasting, top dressing, side dressing, and irrigation. Non acid-forming.

ECONOMICAL SOURCE OF N
At low cost, Calmonite furnishes Nitrogen in the 2 forms needed by all plants — for rapid, early vigorous growth and sustained development.

SUPPLIES CALCIUM, TOO
Contains 35% to 40% calcium carbonate, secondary plant-food essential to soil productivity and good crop yields.

NOW AVAILABLE, F.O.B.
Regular Atlantic and Gulf ports, in even-weight, 6-ply paper bags with 2 bituminous liners.

LOOK AT CALMONITE!
Write for a sample and for additional information today.

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AIMS AND PURPOSES

Council activities encompass the aims and purposes developed when the organization was founded. They are:

1) Support and encourage the agricultural research, educational and control agencies.

2) Inform its membership, farmers and others concerning the plant food needs as viewed by recognized agricultural research agencies.

3) Promote the operation of the fertilizer industry under the present system of private enterprise in continuing to solve the plant food problems of agriculture in cooperation with established research and educational institutions.

4) Cooperate with farmers and the organizations in developing policies designed to place agriculture on a self-supporting basis.

5) Foster the lawful interests of the plant food industry.

6) Encourage the conservation of our basis plant food resources.

HIGHLIGHTS OF APFC 1952 PROGRAM

Accelerated Governmental activities and increased emphasis on plant food as an important "tool" for feeding a rapidly growing popu ation have been foremost in the informational service programs af the American Plant Food Council during the past year.

Meanwhile, the land-grant colleges and the United States Department of Agriculture have developed a national program calling for more efficient use of fertilizer and lime, and further responsibility will be placed on trade associations as clearing houses for important developments in the program, which, to be fully effective, must be publicized widely.

Programs and projects designed to implement sound land-management practices and give wider distribution to agricultural education and research information are not new among Council activities. The routine developments of agricultural education and research techniques are reported as an everyday service. However, the importance of the industry to the national welfare has stimulated more and more inquiries concerning the role that plant foods will play in continuing an agricultural program of abundance.

The Council looks to the land-grant colleges and the state and Federal educational agencies to pave the way for a more enlightened farm population in terms of efficient use of fertilizer and lime. The Council, as a trade association, properly has been called upon to assume even greater responsibility for an orderly flow of information to its members in keeping with the goal of more efficient utilization of plant foods in line with the needs as established by the defense and agricultural agencies. However, all the conventional facilities in the field of public enlightenment will be brought to bear on the p·oblems relating to sound land-management, not the least of which concerns maintaining, replenishing, and increasing the fertility of our soils.

Trade and farm magazines, radio, TV, industry brochures and publications, visual aids, and cooperation with agricultural leaders and their organizations, all have had a vital part in telling the fertilizer industry story and in disseminating information on plant foods in proper relation to other sound land-management practices.

Farm Magazines

Many of the Nation's leading magazines have requested and used stories furnished by the Council, dealing with one or more phases of the fertilizer industry.

With the approval of the American Agricultural Editors' Asociation, an annual "Soil Builders Award for Editors" contest has been established by the Council for the purpose of recognizing both editors and their staff members who have rendered outstanding service as soil builders and, as such, builders of a sounder and more profitable farming system. The award will be made for the first time in 1953.

Nationally known leaders in the field of agriculture will judge the contest, which is divided into two divisions: smaller and larger magazines. The judges are: Walter S. Davis, Jr., The National Association of Soil Conservation Districts; Roger Fleming, Secretary-Treasurer, American Farm Bureau Federation; A. C. Hale, National Vocational Agricultural Teachers Association, Inc.; Wesley Hardenberg, American Meat Institute; Sherman Hoar, National Association County Agricul-

Top leaders in the fertilizer industry are members of the Executive Committee and Board of Directors of the American Plant Food Council. Council President Paul T. Truitt (right) is shown above discussing his organization's programs with Executive Committee Chairman James F. Doetsch, President, Chilean Nitrate Sales Corp.

tural Agents; Herschel D. Newsom, Master, The National Grange; Roderick Turnbull, Editor, Weekly Kansas City Star.

Radio

Another important educational medium contributing to a further enlightened agricultural public is radio, and the Council recently established a transcribed Farm Radio News Service for radio farm directors. Consisting of four 3-minute talks on timely farming subject matter, several hundred radio stations have requested, and used, the service as featured material in their daily programs for farmers. Some of the well-known speakers, thus far, have included: Secretary of Agriculture Charles F. Brannan; Paul T. Truitt, president of the American Plant Food Council; Dr. Robert M. Salter, Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Md.; Dr. Robert Q. Parks, Head of USDA's Division of Soil Management and Irrigation Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Md.; W. A. Minor, Chairman of USDA's Fertilizer Policy Committee and Assistant to the Secretary of Agriculture; O. V. Wells, Chief of USDA's Bureau of Agricultural Economics; Thomas G. Abernethy, Member of Congress from Mississippi, and Chairman of the House Agriculture Sub-Committee on Fertilizer and Farm Machinery; Dr. R. Frank Poole, president of Clemson Agricultural College (Clemson, S. C.) and Chairman, Executive Committee, Association of Land-Grant Colleges and Universities; Dr. Byron T. Shaw, Administrator, Agricultural Research Administration, USDA; Gus F. Geissler, Administrator, Production and Marketing Administration, USDA; and Dr. P. V. Cardon, president, Sixth International Grassland Congress, and Director of the Graduate School, USDA. Periodically, and when the information merits, special agricultural releases have been furnished to stations and their radio farm directors on the general subject of fertilizer and fertilizer usage.

TV

As new "tools" enter the field of informational service, they are incorporated in the Council's programs. And, the newest "tool", of course, is television.

In cooperation with one of the Nation's best known land-grant colleges, the Council has begun the production of television short subjects for use by stations concerned

Left: Staff members of the American Plant Food Council actively supported the Sixth International Grassland Congress at State College, Pennsylvania, in August. Paul T. Truitt (left), Treasurer for the Congress and President of the Council, is shown above receiving a check from Wilbur G. Carlson, of the A. O. Smith Corp., Milwaukee, Wisconsin, Chairman of the Finance Committee of the Congress, while Dr. P. V. Cardon, Director, Graduate School and Research Administrator Emeritus, USDA, who served as President of the Congress, looks on.

Right: Services of the American Plant Food Council include numerous publications designed to add further to the knowledge of sound land management. Dr. W. T. Spanton, (center), Chief, Agricultural Education Service, U. S. Office of Education, is shown receiving the one-millionth copy of OUR LAND AND ITS CARE from Council President Paul T. Truitt (right), and looking on is Dr. John R. Taylor, Jr., Council Agronomist. OUR LAND AND ITS CARE was written by the Agronomic Advisory Committee of the Council in collaboration with the Agricultural Education Service of the U. S. Office of Education, and the booklet is used extensively by vocational-agriculture teachers, county agents, soil conservationists and agricultural workers generally. Copies have been furnished without cost to state and Federal agricultural workers.

with the future of farming and a more aggressive translation of technical "know-how" in the everyday language. The "shorts" not only are carrying a message on one or more phases of sound land-management, but will serve also to bring about a better understanding among consumers of the role that farmers occupy in the national economy.

Publications

Publications have long contributed to the wealth of knowledge that farmers must have to maintain a self-sustaining agriculture. One of the most useful publications issued by the Council has been "Our Land and Its Care," an up-to-date, 64-page, illustrated booklet on our soil and how to keep it productive. Prepared in cooperation with the Agricultural Education Service of the United States Office of Education, one million copies, to date, have been made available to vocational teachers, county agents, extension specialists, soil conservationists, and agricultural leaders throughout the United States.

Many of the Nation's colleges, schools, and agricultural organizations use the publication as a supplementary text, and a steady stream of requests for individual copies, without cost to agricultural personnel, flow into the office of the Council.

Plant Food Journal

The quarterly magazine of the Council, the Plant Food Journal, has become increasingly popular among agricultural leaders and workers. It is devoid of advertising and devoted to the best interests of agriculture. The magazine's mailing list has been enlarged by popular request, and some of the best known federal and state agricultural education and research authorities have been among the authors during the past year.

Motion Pictures

Although the Council's visual aids program is relatively small, new productions already are under way for the purpose of supplementing agricultural information at the producer as well as consumer level of the population.

The Council's first motion picture, "First in the Hearts of Farmers," has been widely acclaimed and used by agricultural workers throughout the United States. Woven around some of the agricultural experiences of George Washington and the importance that he placed on plant foods in a well-rounded land-management program, the film has been viewed by more than two million farmers.

A new motion picture is in production and will be offered to the farming public next year.

Research

Agricultural research grants and fellowships have been emphasized since the Council was founded. And, cooperating with many of the land-grant colleges and other educational institutions, have further added to the knowledge necessary to keep up with the rapid and continuous change in scientific farming.

Other Activities

Working with farm organizations, and particularly farm youth groups, has been given proportional emphasis by the Council.

In cooperation with the National Grange, a nation-wide essay contest on "Conservation Farming for Abundant Living" has just been concluded, with more than 25,000 young men and women, in 48 states, competing for $10,000 in prizes offered by the Council.

"Another Council project designed to stimulate leadership among the Nation's youth consisted of an "Achievement Award", sponsored jointly with the American Society

Annually the American Plant Food Council honors members of the Association of American Fertilizer Control Officials when they meet in Washington. Shown at the head table at the 1952 sessions in Washington are, left to right: Henry A. Davis, AAFCO Vice President; P. A. Yeats, AAFCO President; Dr. John R. Taylor, Jr., Council Agronomist, (who presided); Dr. J. F. Fudge, AAFCO immediate past President; Paul T. Truitt, Council President; Allen B. Lemmon and Dr. Rodney C. Berry, AAFCO past Presidents.

of Agronomy. The top honor, as the best Agronomy Club in the United States, was won by the Texas A & M Student Agronomy Club in 1952 and the winner received an attractive loving cup provided by the Council at the Agronomy Society's annual convention in November."

In stimulating both action and constructive thinking along the lines of conserving and wisely using our soils, the Council has had the cooperation of many of the Nation's leading agricultural spokesmen and workers. The judges for the 1952 essay contest included: Secretary of Agriculture Charles F. Brannan; Dr. Hugh H. Bennett, then Chief of the Soil Conservation Service, USDA; Miss Lois M. Clark, Assistant Director, Division of Rural Service, National Education Association; Dr. R. Frank Poole, president of the Association of Land-Grant Colleges and Universities; Dr. W. T. Spanton, Chief, Agricultural Education Service, U. S. Office of Education; Miss Jennie Williams, president of the National Home Demonstration Council; Dr. M. L. Wilson, Director of Extension Work, USDA.

TOP SPEAKERS SCHEDULED FOR FEBRUARY MIDWEST SOIL MEET

More than 400 members of the fertilizer industry and allied interests are expected to attend the fifth annual meeting of Midwestern agronomists and industry representatives at the Palmer House in Chicago, Friday, February 20.

Z. H. Beers, executive secretary of the Middle West Soil Improvement Committee, sponsors of the meeting, pointed out that the conference will be open to all persons interested in fertilizer research. No special invitation is required.

Soils specialists from Corn Belt states will report on research projects which are developing new information on more efficient use of fertilizer in crop production.

Dr. Harold Myers, associate director of the Agricultural Experiment Station, Kansas State College, will preside. Dr. Myers has been developing the program in cooperation with other Midwestern agronomists.

The agronomists, fertilizer men and representatives of other industries will be welcomed to the meeting by J. D. Stewart, president of the Middle West Soil Improvement Committee.

Dr. W. A. Albrecht, University of Missouri, will open the discussion with a paper on "What is Research Aiming to Do?"

The subject of "Fall Versus Spring Application of Fertilizer" will be covered by J. T. Pesek, Jr., of Iowa State College.

Dr. H. E. Myers, associate director Kansas AES, who will preside over the Midwest Soil Improvement meeting.

Dr. R. L. Cook, Michigan State College, will report on "Granular Versus Pulverized Fertilizer." F. W. Smith, Kansas State College, will discuss "Methods of Applying Nitrogenous Fertilizer."

"Effectively Increasing the Use of Fertilizer and Lime" will be the subject of a report by Dr. L. M. Turk, head of Michigan State College's agronomy department.

Russell M. Coleman, president of the National Fertilizer Association, will discuss "Disposition of Proposed Future Fertilizer Output."

Dr. J. B. Peterson, Purdue University, will report on "Fertilizer Grades and Ratios Recommendations."

A question and answer period will conclude the afternoon program. In this season, the agronomists will be on the receiving end.

Southern Agronomists Meeting In N. O., Feb. 9—

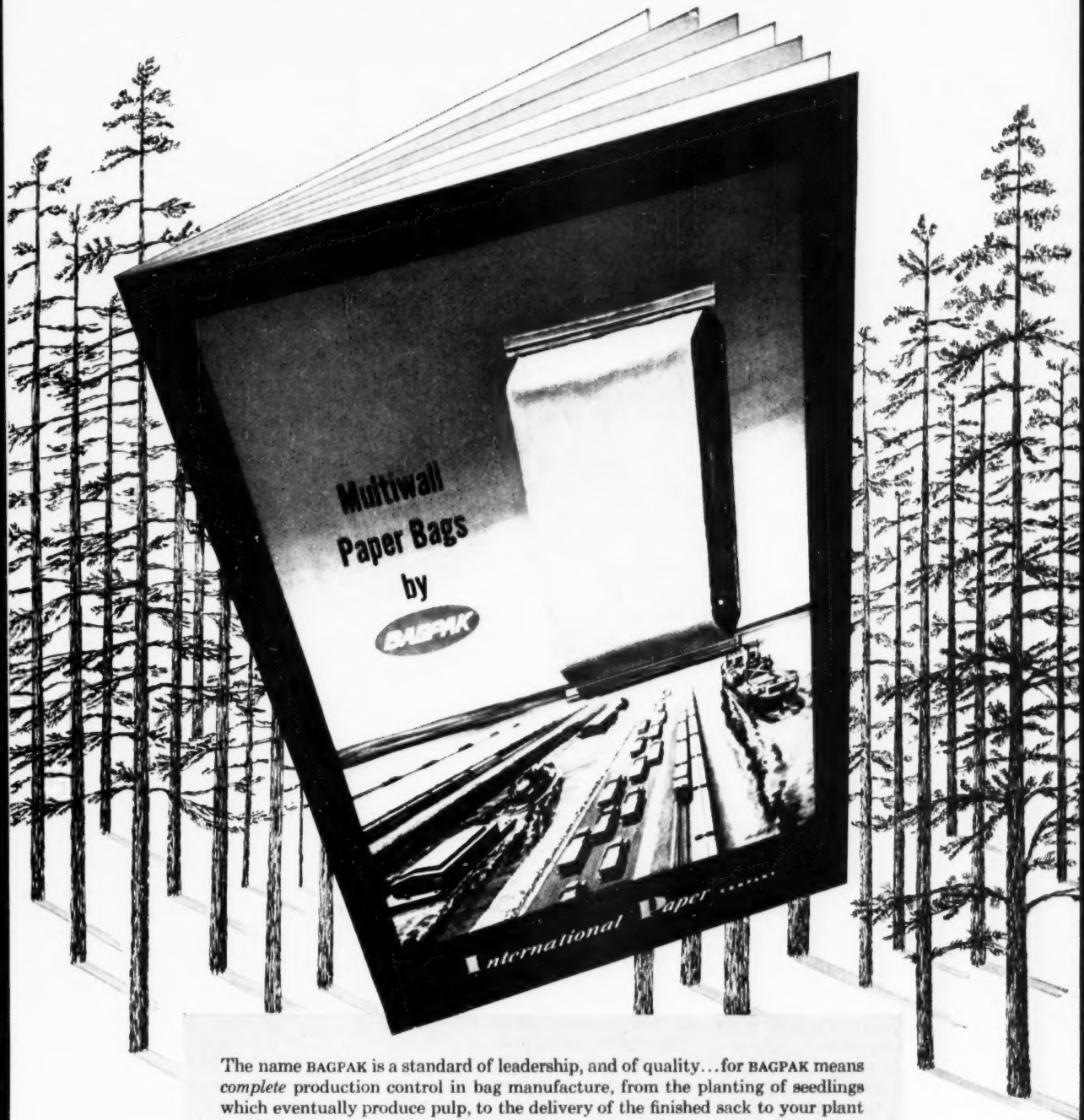
The annual meeting of the Association of Southern Agricultural Workers will be held in New Orleans February 9, 10, and 11, 1953, and sessions of the Agronomy Section are scheduled for the Jung Hotel for all three days. General subjects to be discussed include plant improvement and pasture and forage production. Reports on research work in soils and fertilizers will also be made. W. H. Garman of the Office of Experiment Stations, Washington, D. C., is Chairman of the Agronomy Section and Fred H. Hull of the Florida Agricultural Experiment Stations is Secretary.

Kentucky Pasture Program Kickoff

The annual kick-off meeting launching Kentucky's Green Pastures Program was slated to be held January 7 at the Seelbach Hotel, Louisville. Master Pasturemen were to be introduced, and the meeting from 10 to lunchtime was to be devoted to reports, talks, fun — and finally eats at a dutch lunch.

S. C. Conference January 15 At Columbia

All Fertilizer Dealers, Salesmen and Manufacturers selling in South Carolina have been cordially invited by Dr. R. F. Poole, President of The Clemson Agricultural College, Clemson, South Carolina, to attend a one day fertilizer conference in Columbia, South Carolina at the Wade Hampton Hotel on Thursday, January 15, 1953. Topics pertaining to the agricultural outlook, fertilizer usage and availability of fertilizers, insecticides, planting seed and credit to farmers through various agencies will be discussed by competent authorities.



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Of TIME AND PHOSPHATES

By V. Sauchelli

Director, Agricultural Research, The Davison Chemical Corporation,

Introductory

Alice in Wonderland was running hand-in-hand with the Queen, and just as fast as she could. But she was surprised to find she was getting nowhere. "What did you expect?" asked the Queen.

"Well," panted Alice, "in our country you would generally get to somewhere else."

"That's a slow sort of country," said the Queen. "Now here you see, it takes all the running you can do to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that."

Well, we in scientific agriculture have to run like Alice just as fast as we can just to keep pace with the speedy developments in technology on the farms, at the mines, and in the plantfood processing plants. Modern science is traveling at a terrific pace. We are beginning to realize that this is indeed the Atomic age. Change is the order of the day, slower in some branches of modern life, faster in others. But change, not statism, seems to be the rule. Let us not decry it. We should want it that way. For change is the sign of vigorous life.

You will agree with me, I am sure, that the changes in fertilizer technology and usage of the past 25 years have been healthy, constructive and altogether beneficial to agriculture, industry and the common welfare.

Fertilizer Use

My subject is phosphorus in agriculture. Perhaps some brief remarks on fertilizer use in the U.S.A. can serve a useful prelude to the discussion on phosphorus. The importance of fertilizer to agriculture and the public at large is now universally recognized. Also recognized is the necessity for American farmers to increase by a large margin the production of all agricultural commodities in the years ahead. A fast growing population coupled with a more or less static acreage of cropland necessities a more intense production per unit of land from the acreage we now have. Compared with pre-war levels, the total output of farm commodities in the U.S.A. by 1950 increased by about 40 percent to meet the extraordinary demands created by the increase of our domestic population, our defense needs and the requirements of over-seas allied countries. The remarkable record achieved by American farmers during the War period was made possible to a large degree by an expanded use of fertilizers, lime and pesticides. It has been estimated by the U. S. Department of Agriculture that the proportion of our total crop production attributable to the use of fertilizer was about 14 percent in 1938 and about 25 percent in 1951.

The increased use of fertilizer also makes a major contribution to the maintenance and improvement of soil fertility and to the success of soil erosion control and water conservation practices.

Phosphorus a "Key Mineral"

Phosphorus is recognized by all authorities as a key mineral in agricultural production. It is distributed somewhat unevenly in the earth's crust. According to the U. S. Deptment of Agriculture as much as four-fifths of the crop soils of the Nation are inadequately supplied with this essential nutrient.

Prior to World War II the National Resources Board estimated that the soils of the Nation suffered annual withdrawals of phosphorus in excess of replacements by more than 3,200,000 tons, basis P^2O^5. In 1946 a special committee of the Association of Land Grant Colleges and Universities concluded that American farmers could wisely use upwards of 6,000,000 tons of P_2O_5 a year to maintain a soil phosphorus balance.

Compared with these estimates of need it is interesting to observe that the Nation's production of P_2O_5 for fertilizer use up to 1941 had never exceeded 1,000,000 tons a year; in 1950 it had risen to a little above 2,000,000 tons against a productive capacity of some 4 million tons; and by 1955, it is hoped the Country will be producing at about 3:5 million tons annually. Total world production in 1950-51 was about 5.6 million metric tons, P^2O^5 basis, of which superphosphate accounted for about 75 percent.

The problems associated with soil phosphorus, the economical use of phosphate fertilizers, and the proper phosphorus nutrition of plants and animals are about as complex as any found in economics, soil-and biochemistry. An enormous literature on these problems has accumulated. Although a great deal has been accomplished toward their solution, a vaster amount or research needs to be done before we can feel we have approached the answers. We can say confidently that on some areas of the Coastal Plain the long-time applications of phosphate have significantly raised the phosphorus fertility level of the soil with benefit to the yield and quality of crops and profit to the farmers.

"Super-phosphate"

The fertilizer industry is about a century old. It had its birth with the production of soluble phosphate by John B. Lawes in England in 1842. The process comprised treating a local mineral phosphate (coprolites) with sulfuric acid. He called the product, "super" phosphate. The name has stuck ever since. Soluble

(1) Paper presented at Southeastern Regional Meeting of the American Chemical Society, Auburn, Alabama.

phosphates from bones had been produced earlier by the same process. But, I believe it is correct to consider the acidulation of mineral phosphate as the real beginning of the commercial fertilizer industry. Ever since then phosphate has been considered the backbone of the industry.

Led by the initial success of Lawes, other similar acidulation works were established in Europe. The discovery of mineral phosphates in South Carolina in 1867 started a rapid development of the industry in the United States. The subsequent discovery of phosphate rock deposits in Florida in 1882 accelerated the development of the industry on this Continent. By the turn of the Century, 81 companies were mining phosphate rock in Florida. The mining industry has progressed remarkably. In recent years it has developed methods for processing and concentrating low grade ores by utilizing floatation principles which have vastly increased the Nation's reserve supply of utilizable rock.

Phosphate rock deposits have been located in many countries of the world. The principal deposits of commerce at present are those in Florida, U.S.A.; North Africa (Algeria, Morocco, Egypt, Tunisia); the Pacific Islands (Nauru, Christmas and Makatea); and Russia. Other deposits exist but have not been developed as yet despite their extensiveness and high quality, owing particularly to their unfavorable location. Transportation facilities and convenience to ocean freight are indispensable factors to the successful commercial exploitation of any natural resource. In our country very rich reserves of phosphate rock are located in the northwestern States—Idaho, Montana, Utah and Wyoming. But, although these deposits represent about 60 percent of the Nation's total, their distance both from ocean freight and the big consuming areas of the country have delayed their commercial development. The Florida deposits representing about 38 percent of the Nation's total, furnish about 95 percent, the Tennessee deposits about 1.3 percent and the Western, 2 percent of the total phosphates consumed by the normal superphosphate industry.

Table 1.
PLANT FOOD CONSUMPTION IN THE UNITED STATES

Period	Nitrogen	Phosphoric Acid	Potash	Total	Total Fertilizers
	1000 Tons (N)	1000 Tons (P_2O_5)	1000 Tons (K_2O)	1000 tons (N, P_2O_5, K_2O)	1000 Tons
1900	62	246	87	395	2,730
1910	146	499	211	856	5,547
1920	228	660	257	1,145	7,296
1930	377	793	354	1,524	8,425
1940	419	912	435	1,766	8,656
1950-51	1,285	2,235	1,445	4,965	19,500
Increase since 1940	866	1,323	1,010	3,199	10,844
Est. supply 1951-52	1,375	2,100	1,515	4,990	20,000

Source: U.S.D.A.

Table 2.
PHOSPHATE ROCK PRODUCTION
AND ESTIMATED PRODUCTION OF SUPERPHOSPHATE
IN U.S.A.

Year	Estimated Consumption for: Direct Application	Manufacture of Superphosphates	Superphosphate Production 18% equiv.
	1000 long tons	1000 long tons	1000 short tons
1868	—	16	31
1880	0.1	166	320
1890	1.7	315	606
1900	8	970	1,868
1910	20	1,494	2,876
1920	73	2,779	5,351
1930	42	2,368	4,559
1940	106	2,565	4,865
1950	787	5,695	9,558

Source: U. S. Bur. Mines & N.F.A.

Sulfur and Sulfuric Acid

Of course, in the growth and expansion of the superphosphate industry, we must not forget the other partner in the deal—sulfuric acid. The 1950 production of normal superphosphate consumed 5.25 million tons of phosphate rock and 3.2 million tons of sulfuric acid (basis 100% H_2SO_4). The annual production of sulfur in the U.S.A. is about 6 million tons or a little over half the world tonnage.

Without the abundant supplies of relatively low-cost sulfur and sulfuric acid made available to the domestic industry from 1903 to the present by the Frasch sulfur-process in Texas and Louisiana, the rate of growth of the phosphorus industry would have been considerably retarded. We can state it this way: the enormous expansion of the normal superphosphate industry of the U.S.A. was made possible by the rich supplies of easily mined Florida pebble rock phosphate, abundant supplies of low-cost sulfur and sulfuric acid, a simple, cheap manufacturing process and a rapidly expanding agriculture serving the needs of a young, vigorous, progressive Nation.

At present a total of 202 normal superphosphate plants are distributed among 32 States, with the greatest concentration (71 plants) in the South Atlantic Region. Sixteen States are without manufacturing facilities and of these, six lie east and 10 west of the Mississippi River. The location of a superphosphate plant is dictated largely by transportation facilities, access to sulfuric acid supplies and of course the consuming market. Normal superphosphate is a relatively low-priced commodity and so are phosphate rock and sulfuric acid. Both the raw materials and the processed product cannot stand high transportation costs: these considerations explain the present location of the industry. Low rail and water freight

Table 3.
GROWTH OF PLANTS MANUFACTURING ORDINARY SUPERPHOSPHATE IN 1941 AND 1951

Region	No. of Plants		Annual Productive Capacity (1) 1000 tons		Percent Increase in Productive Capacity in 1951 over 1941
	1941	1951	1941	1951	
New England	3	4	213	300	40
Mid-Atlantic	14	14	1,987	1,941	-2
Southern (2)	99	123	4,885	9,252	91
East No. Central	28	45	1,239	3,855	264
West No. Central	0	11	0	637	
Mt. & Pacific	2	5	(a) 145	553	
Continental U.S.	146	202	8,429	16,538	96

(1) Expressed as 18% P_2O_5.
(2) Includes Va., N.C., S.C., Ga., Fla., Ky., Tenn., Ala., Miss., Ark., Okla., Tex., & La.
(a) Includes two plants in Mich. which are tabulated among the number of plants for E. No. Central Region.
Source: K. D. Jacob, U.S.D.A.

Table 4.
REGIONAL CONSUMPTION OF AVAILABLE P_2O_5 AS COMMERCIAL FERTILIZER IN THE UNITED STATES 1940 and 1948-49

Region	1940 1000 tons	1948-49 1000 tons	Increase		Percentage of Total Consumption	
			1000 tons	Per Cent	1940	1948-49
New England	42	59	17	39.7	4.6	3.0
Middle Atlantic	161	234	73	45.7	17.6	12.1
South Atlantic	288	488	200	69.6	31.5	25.1
E. No. Central	128	404	276	216.6	14.0	20.8
W. No. Central	26	187	161	629.1	2.8	9.6
E. So. Central	174	302	128	73.3	19.1	15.6
W. So. Central	36	141	104	286.4	4.0	7.2
Mountain	11	33	23	211.1	1.2	1.7
Pacific	31	74	43	136.1	3.4	3.8
Territories	16	21	5	28.4	1.8	1.1
United States	912	1,942	1,029	112.8	100.0	100.0

Source: K. D. Jacob, U.S.D.A., Bu. Plant Industry

rates was one of the decisive factors supporting the establishment of plants at the following centers: 7 plants in the vicinity of Norfolk, Va. and East St. Louis; 6 plants in each of the areas around Charleston, S. C., Baltimore, Md.; Savannah, and Atlanta, Ga.; Montgomery, Ala.; and Nashville, Tenn.

Regional Consumption of Phosphate Fertilizer

Domestic consumption of phosphoric acid has increased steadily with the use of fertilizer. As mentioned previously, phosphoric acid is the backbone of the industry. All mixed fertilizers contain it. Practically all crop soils lack adequate amounts of it to sustain the heavy demands of modern agriculture. The rate of increase in consumption during the decade 1940-51 has been remarkably steady and sharp, especially in the newer consuming areas of the Corn Belt and the Pacific Coast.

By 1940 the consumption of P_2O_5 in domestic fertilizers, compared with 1900, or in 40 years, had increased 4-fold, and only about 1.5 times over that of 1920 and 1930. By 1951, consumption had jumped, in a decade, to over 2.2 million tons of P^2O^5, or about 2.5 times that consumed in 1940.

Future consumption of P^2O^5, it is estimated, within the next 25 years will be greater in the Middle West, especially in the States bordering the Mississippi River. In nearly all States east of the Great Plains Region it is expected that much greater emphasis will be placed on the use of fertilizers for hay and improved pastures and for this use phosphate will play one of the leading roles among plant nutrients. Changes in land use in the South are expected to maintain and perhaps increase the relative amounts of phosphate to build up and maintain forage and pasture acreages.

Normal Superphosphate Production

Total domestic production of normal superphosphate in the calendar year 1950 amounted to about 9.5 million tons (18% P_2O_5 basis), an increase of 137 percent over the production in 1940. The present capacity of the domestic industry has been estimated by the U. S. Department of Agriculture at about 16.5 million tons, just about double what it was in 1940. Actual production in 1950 was about 60 percent of total productive capacity. To appreciate how the industry is expanding into new consuming territory, it is helpful to point out that of the 32 States producing normal superphosphate in 1950, the following 11 States had no production in 1940: Maine, Wisconsin, Iowa, Nebraska, Kansas, Missouri, Kentucky, Oklahoma, Idaho, Utah and Washington. The center of fertilizer consumption is definitely moving westward.

The production of normal grades of superphosphate exceeds by far that of the other grades. The total normal superphosphate production in 1950 was 9,557,000 tons, 18% basis. In the same year the domestic triple superphosphate industry, comprising 9 plants, produced 660,134 tons of superphosphate, basis 45% P_2O_5 and used 274,122 tons of phosphate rock in its production. Florida, by the way, supplied 226,000 tons of the rock, about 82 percent, with Tennessee and the West supplying about 17% or 48,000 tons.

Other phosphates were processed but compared with the normal and triple grades their total was relatively small.

It is noted that for the country as a whole the productive capacity for normal superphosphate had increased in 1951 by 96 percent over that

of 1941. The most striking gains were made in the western part of the Corn Belt and on the Pacific Coast.

Normal superphosphate accounts for about 90 percent of the chemically processed available P_2O_5 produced as domestic commercial fertilizer. Time and new developments may change the relative position of this grade; however, the change is bound to be gradual owing to the economical advantages of its manufacturing process. It has maintained its premier rank for over a century and it will not easily be displaced.

Other Phosphates

Other phosphates are being seriously considered to replace normal superphosphate or for adding to the total supply of needed phosphatic fertilizers.

Table 6.
U. S. CONSUMPTION OF PHOSPHATIC MATERIALS FOR DIRECT APPLICATION
(1,000 Short Tons)

Material	1946-47	1949-50
Normal Super.	1,620	1,855
Triple Super.	161	265
Ammon. Super.	3	2
Ground Phos. Rock	774	749
Basic Slag	230	287
Fused Tricalc. Phos.	28	16
Calc. Magnesium Phos.	59	5
Raw Bone Meal	5	7
Steamed Bone Meal	5	6
Phosphoric Acid	4	7
Calc. Metaphosphate	59	5
Ammonium Phosphates	75	143

A new factor, not altogether ignored in the past, has now intruded itself rather dramatically into the picture. I refer to sulfur. We have already pointed out the influence of low-cost sulfur for sulfuric acid production in favoring the development of the superphosphate industry. Supplies of cheap brimstone sulfur from the domes of the Gulf States are threatened by early exhaustion. This factor has accelerated serious consideration of other phosphate processes which do not require sulfuric acid or which may be able to utilize substantially lower amounts. Such processes comprise two main groups: thermal or furnace methods; and processes using other acids than sulfuric or a mixture of acids. These other phosphates will be discussed further on. In our country TVA has pioneered in the investigation of these furnace and alternate acid processes. They have now at various stages of laboratory and pilot plant development a half dozen or more processes for producing high-analysis phosphatic and nitraphosphate type fertilizers.

Table 5.
ANNUAL CAPACITY OF PLANTS MANUFACTURING ORDINARY SUPERPHOSPHATE AND OR WET BASE GOODS. SPECIFIED YEARS.

Year	Number of Plants	Material (2)	P_2O_5
		1000 tons	1000 tons
1920 (3)		8,340	1,500
1930 (3)		9,702	1,745
1940	146	8,399	1,512
1945		11,486	2,068
1946		12,499	2,250
1947		13,247	2,384
1948		14,121	2,541
1951	202	16,538	2,977

(1) Source: U.S.D.A., BPI (NFA Fertilizer Review, Jan.-Feb., 1948.
(2) Basis 18% P_2O_5.
(3) U.S.D.A., PMA

Triple Superphosphate

The production of concentrated super having 42 to 48% P_2O_5 was first attempted about 40 years ago, but apparently it was born 30 years ahead of its time. It is made by treating phosphate rock with phosphoric acid instead of sulfuric. However, to obtain the phosphoric acid the rock has to be first leached with sulfuric acid. During the past decade this and other high analysis fertilizers have enjoyed increasing popularity. One of the significant factors supporting the interest of these concentrated materials is their low-at-the-farm cost per unit of plant nutrients. Reference has previously been made to the concentration of superphosphate plants in areas favored by cheap transportation and high rates of consumption. With the recent sharp increase in demand for fertilizers throughout the western Corn Belt has come an intensified interest in high-analysis goods because with such types units of plant-food can be delivered on the farm at lower cost. More farmers, especially in the great bread-basket area of the Middle West, learned for the first time during the War period that fertilizers can increase per-acre yields and lower production costs. Accordingly, a growing demand for fertilizers has been developing in this Region. The local industry could not quickly expand to satisfy the unexpected increase because shortages of construction materials and labor caused by defense needs. Shipments of fertilizer materials had to be made from other areas and high analysis goods were given preference as a means of keeping prices down to competitive levels. The demand for such higher analysis has remained. Since higher analysis require triple superphosphate in their formulation, the fertilizer industry is doing everything it can to expedite the construction of new manufacturing facilities to supply the additional triple superphosphate.

Table 7.
ESTIMATED ANNUAL CAPACITY PRODUCTION OF TRIPLE SUPERPHOSPHATE

	No. of Plants	Short Tons Material (1)	Short Tons P_2O_5 (1)
1930	5	97,800	44,000
1940	8	400,000	180,000
1945	9	496,500	223,400
1947	7	488,900	220,000
1948-49	9	648,900	292,000
1950	9	660,130	297,058

(1) Basis 45% P_2O_5.
Source: USDA, Bur. of Plant Industry, Soils, & Agricultural Engineering.

The Government through Defense Production Authority is moving to increase phosphate fertilizer capacity to its previously announced goal of 3.6 million tons of P_2O_5 by 1955. By the first of October this year twelve certificates for rapid tax

Table 8.
ELEMENTAL PHOSPHORUS IN THE U.S.A.
PRODUCERS AND THEIR CAPACITY – 1952

Producer	Locations	Number Furnaces	Capacities in Tons	Company Capacity Tons
Monsanto Chemical	Columbia, Tenn.	6	65,000	
	Soda Springs, Idaho	1	25,000	90,000
Victor Chemical	Mt. Pleasant, Tenn.	4	35,000	
	Silver Bow, Mont	2	28,000	
	Tarpon Springs, Fla.	1	10,000	73,000
Westvaco Div. of Food Machinery	Pocatello, Idaho	4		41,000
TVA	Wilson Dam, Ala.	4		36,000
Virginia-Carolina	Charleston, S. C.	1	9,000	
	Nichols, Fla.	1	5,000	14,000
American Agricultural	S. Amboy, N. J.	1	3,000	
	Pierce, Fla.	1	5,000	8,000
Oldbury Electro-Chemical	Niagara Falls, N. Y.	1	8,000	8,000
	Total Annual Capacity			270,000

Source: Chemical Week 8 2 52

write-off, including nitra-and ammonium phosphate plants, had been issued and another six are pending but should be out before the end of this year, making a total of 18 plants to be built in this expansion program.

In the production of triple by the wet process it must be remembered that sulfuric acid is required and the quantity is somewhat higher per unit of P_2O_5 than in the normal superphosphate process. Because of a future shortage of low-cost sulfur the switch to the wet triple process does not help the situation. In 1950 seven of the country's nine triple superphosphate plants made phosphoric acid by the sulfuric acid process. In terms of 50% phosphoric acid (H_3PO_4), 80% of the phosphoric acid used to acidulate phosphate rock in 1950 was manufactured by the wet-process and 20% by the electric furnace process, according to a report by K. D. Jacob of the U. S. Department of Agriculture. This prompts me to comment on the possibility of electrothermal phosphoric acid invading the fertilizer domain.

Electrothermal Phosphorus

At present none of the 6 commercial producers of electrothermal phosphoric acid is furnishing acid for fertilizer purposes. TVA is the only producer which is converting this acid to triple superphosphate. Commercial producers of electrothermal acid find it more profitable to channel it into industrial uses, primarily for the manufacture of detergents and water softeners. So long as cheap sulfur is available sulfuric acid will preempt the phosphate rock acidulation field whether it be for the production of normal or triple superphosphate. In time it may happen that industrial users will bid the price of the fast-diminishing supplies of brimstone sulfur to a level beyond the reach of the triple superphosphate manufacturer. A similar situation happened in the organic nitrogen field some years ago, when the livestock feed industry out-bid the fertilizer producers for the organics and forced the industry to turn to lower priced inorganic sources of nitrogen. Although the breaking point in the price of these two competitive acids may not be reached for many years to come, if and when it does happen, the fertilizer field will be wide open to electrothermal phosphoric acid, especially in those areas not too distant from sources of supply.

Alternatives to Superphosphate

Throughout the world superphosphate is now the principal supplier of nutrient phosphorus in agriculture. In 1950-51 it accounted for 77 percent of the total world consumption. Owing to the sulfur supply situation in the U.S.A. which is the main source of the world's supply at present, many countries besides our own are prudently evaluating the agricultural, economic and technical merits of all phosphatic fertilizers not requiring sulfuric acid in their manufacture. We can expect that methods for solubilizing phosphate rock other than the use of sulfuric acid are bound to be utilized more and more in the future. The alternative phosphates most generally being considered can be grouped as those made by thermal processes; those made by the phosphoric acid process; those made by the nitric acid process; and those made by combinations or modifications of these other processes.

1. Among the thermal processed phosphates are:

a. **Rhenania Phosphate.** Developed in Germany; consists essentially in sintering phosphate rock with soda ash and sand at 1200°C—1250° C. Contains about 22 to 30% P_2O_5 soluble in citrate solution. German production is about 100,000 tons per annum. Small tonnage is being produced in western U.S.A. and in Chile.

b. **Silico-phosphate.** Similar to Rhenania; process operates at higher temperatures and uses less soda ash. Contains about 27% citric acid soluble P_2O_5. Great Britain probable producer in the future.

c. **Lubeck Phosphate.** Phosphate rock is mixed with sodium sulfate or potassium and coal and heated to 800°C to 900°C. Contains about 22% P_2O_5 soluble in citrate. No known commercial producer.

d. **Roechling Phosphate.** Process developed in Germany. Phosphate rock is reacted with soda slag from steel mills at a temperature of 1,250°C. Where the soda slag is available, process should be more attractive than Rhenania.

e. **Coronet Process.** Developed in Florida. Phosphate rock mixed with silica is sintered in rotary kiln. TVA has similar process where rock is mixed with silica and heated in a shaft furnace. Product used primarily as defluorinated rock for livestock feed purposes.

f. **Olivine Fusion Process.** Developed by TVA. Phosphate rock fused

with natural magnesium iron silicate (olivine) in an arc furnace. Final product contains calcium magnesium phosphate, at least 19 % P_2O_5 soluble.

g. **Basic slag.** The slag results from presence of phosphorus in the iron ore used in the Bessemer process for making steel. Produced chiefly in Europe, small amount at steel plants in Alabama.

h. **Triple superphosphate.** Phosphate rock smelted in an electric furnace to liberate elemental phosphorus which is converted to phosphoric acid, triple superphosphate or calcium metaphosphate. Developed by TVA. Cheap electrical power required.

2. Phosphoric acid presesses. Among products formed are:

a. **Triple superphosphate.** Produced by reacting phosphate rock with phosphoric acid. Product can have as high as 50% available P_2O_5. The acid is produced by leaching rock with sulfuric acid. Cost to produce P_2O_5 by this process higher than for normal superphosphate. Lower handling and transportation costs per unit of P_2O_5 offset disadvantages.

b. **Ammonium phosphates.** Phosphoric acid neutralized by ammonia. Relatively expensive but owing to its nitrogen content, costs of handling and transportating it are lower per unit of plant food and makes it attractive to fertilizer manufacturer otherwise handicapped competitively.

c. **Calcium metaphosphate.** Manufacture depends upon availability of elemental phosphorus. Process really belongs to thermal group. Elemental phosphorus from electric furnace is burned at bottom of shaft furnace and forced up through a column of phosphate rock under high temperatures. Phosphorus pentoxide and the rock react to form a slag consisting largely of calcium metaphosphate.

3. Nitric acid processes.

a. **Norsk Hydro Process.** Phosphate rock treated with 65% nitric acid containing a small quantity of ammonium nitrate. Double salt crystallizes out upon cooling (5 Ca $(NO_3)_2$, 2 NH_4NO_3 10 H_2O). Ammonia and potassium salts are added to the lye. Resultant fertilizer contains potash salts, ammonium nitrate, calcium phosphorus and ammonium phosphate. Process being used in Norway and in France.

b. **Dutch State Mines Process.** Phosphate rock is treated with nitric acid and subjected to a complicated process to form a mixed fertilizer containing calcium nitrate, and a mixture analyzing 20% nitrogen and 20% citrate soluble P_2O_5.

c. **Nitraphosphate.** Phosphate rock treated with nitric acid, calcium nitrate component separated and liquor containing phosphoric acid is mixed with ammonium nitrate and neutralized with ammonia as required. Product very hygroscopic.

d. **I.C.I. nitrophosphate**

e. **C.R.L. nitrophosphate.** These are British developments: (1) by Imperial Chemical Industries and (2) by Chemical Research Laboratory of the Government Department of Scientific and Industrial Research. Part of sulfuric acid normally used is replaced by nitric acid. No commercial development as yet.

f. **P.E.C. Process.** French development. Societe Potasse et Engrais Chimiques. Uses a mixture of sulfuric and nitric acids. Process involves no by-products, no evaporation, filtering or decanting steps, and seems to be simple and easy to carry through.

g. **Miscellaneous Processes.** A number of miscellaneous processes have been described in the literature, some being more promising than others. TVA has looked into several possibilities, the French have described about a half dozen. As previously mentioned, the more promising are receiving close investigation in many countries for the purpose of determining their advantages over the normal superphosphate process. Availablity of raw materials, fuel and power requirements, cost of manufacture, and their relative agronomic value for different crops under different soil and climatic conditions—these factors require time and careful study before any process can attract risk capital to exploit the process.

Agronomic Evaluations

Phosphorus is the backbone of the fertilizer industry and superphosphate has dominated all other phosphates for over a century as the most acceptable source of plant nutrient phosphorus.

Because concentrated superphosphate, unlike the normal grade, does not contain calcium sulfate it is being preferred as the standard for rating other carriers of phosphorus in field tests. As a source of phosphorus, the triple or concentrated superphosphate is as effective as normal superphosphate in influencing crop yields.

Raw mineral phosphates are as a rule less effective as sources of nutrient phosphorus than the processed phosphates. Where raw phosphates have been most effective in field tests, it was necessary to apply from 2 to 3 times as much P_2O_5 to give increases of yields equal to the yields from superphosphate.

Rhenania or silicophosphate has been as effective as superphosphate on root crops in tests in Great Britain under the acid soil conditions, pH less than 5.5; on less acid and neutral soils, superphosphate was superior.

The metaphosphates are satisfactory sources of nutrient phosphorus on soils of the humid region; the calcium metaphosphate however, is less dependent than the water-soluble phosphates on alkaline soils, but more effective than di- or tricalcium phosphates on calcareous soils.

Ammonium phosphates seem to be satisfactory on alkaline soils and if their residual acidity is neutralized with lime give good results on acid soils.

Nitrophosphates have given as good results as superphosphate as sources of phosphorus when tested on corn, cotton and cereal grains on acid soils of the humid regions.

Dr. A. B. Stewart, a leading scientist of Scotland said at the recent Symposium on Phosphorus (Urbana, Illinois, August 26-28, 1952). "The greatest compliment we might pay to a phosphate fertilizer is to say that it appears to be as good as superphosphate."

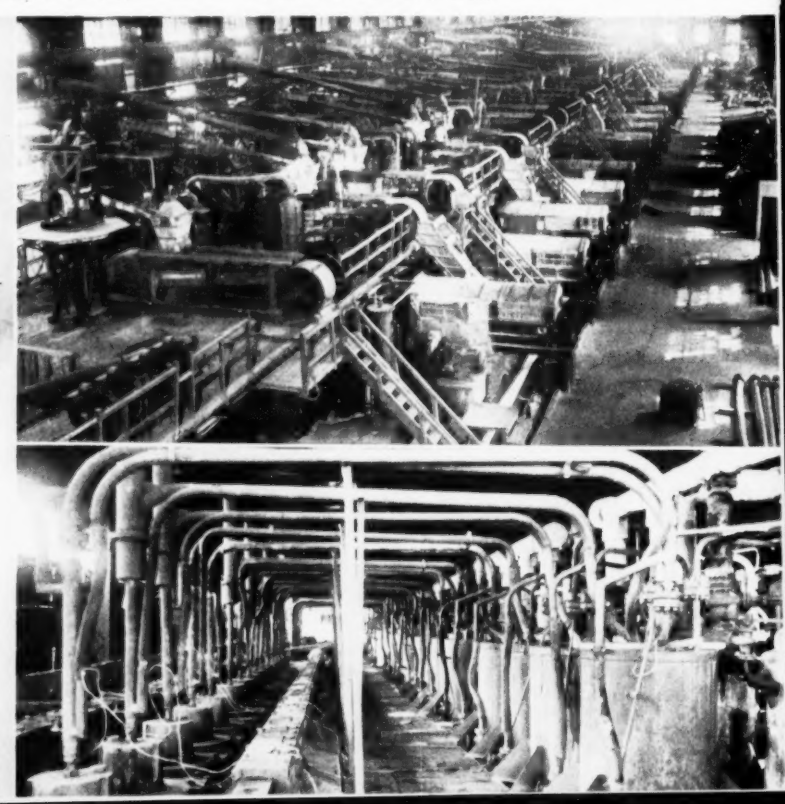
Japan — A BIG FACTOR IN FAR EAST FERTILIZER

Within a few hours after arrival, a visitor to Japan learns about one aspect of Japanese fertilizers, the "honey bucket" or night soil. Few, however, know that Japan leads the Far East in the production of chemical fertilizer and that in prewar days was among the leading nations of the world in chemical fertilizer output. The needs of Japan's soil brought the nation early into the fertilizer trade. In addition to animal manures and human excrement, early records show that Japan had by 1642 developed a fishmeal fertilizer which the nation was exporting. By 1866, inorganic fertilizer came in the superphosphate field. Japan's acid soil, low in plant nutrient content, light and fluffy, and deficient in iron has forced Japan to supplment its farm manures, compost and night soil with commercially manufactured fertilizers.

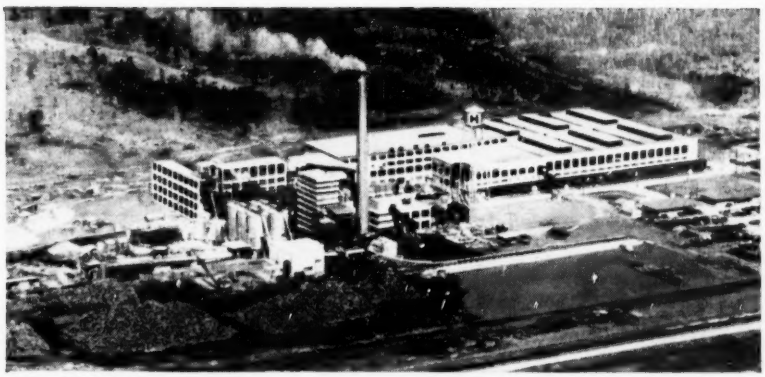
Today, Japan needs for domestic and export use 2,250,000 metric tons of nitrogenous fertilizer and 1,725,000 tons of phosphatic fertilizers. In prewar years, with its colonies, Japan could produce this fertilizer without importing any ingredients. Since the end of the war, about one million metric tons of phosphate rock and 178,000 metric tons of potash must be imported annually. Although Japan's fertilizer plants were damaged during the war, by the 1950 fertilizer year, which began in August 1950 and ended in July 1951, Japan had recovered sufficiently to produce 2,000,000 metric tons of nitrogenous fertilizer and 1,562,000 metric tons of phosphatic. In the recently ended fertilizer year, August '51-July '52, output of nitrogenous fertilizer production rose to 2,317,956 metric tons and phosphatic to 1,671,063 metric tons. July was the high month with a nitrogenous output of 219,898 metric tons and 107,530 in the phosphatic field. For the recently ended fertilizer year, the Ministry of International Trade and Industry had set a nitrogenous goal of 2,300,000 tons, which was topped; the phosphatic goal of 1,700,000 tons, however, was not reached.

In the production of nitrogenous fertilizers, usually given in Japan in terms of its most important type, ammonium sulphate, annual capacity output is estimated at about 2,700,000 tons. Both the electrolytic and gas process are used in manufacture. While the electrolytic process would ordinarily be cheaper than gas, the electric power situation in Japan makes the gas production process most common. At the present time, Japan is embarking on an electric power expansion program, which when completed will result in greater use of the electrolytic method. Even the coal and coke, on which the gas process depends,

1. Toyo High-Pressure Industry Company is Omuta ammonium sulphate factory. Omuta is in Fukuoka Prefecture, Kyushu, Japan. Picture shows gas towers, used in a purefying process.
2. Inside of the Omuta ammonium sulphate factory, showing the gas process of manufacture.
3. Inside of the Toyo High-Pressure Industry Company's ammonium sulphate plant at Sunakawa, Hokkaido, Japan's most northern island. Also the gas process.



HUDSON MULTIWALL SACKS ARE NOW THE INDUSTRY'S MOST FULLY GUARANTEED



This huge new ultra-modern Hudson mill at Palatka, Florida can make firm promises because it is independent of outside suppliers who may cause delays. Here, every step in the manufacture of Hudson Multiwall Sacks, from tree to the finished product, is under Hudson's exclusive ownership.

INTEGRATED OPERATION BACKS UP HUDSON GUARANTEE

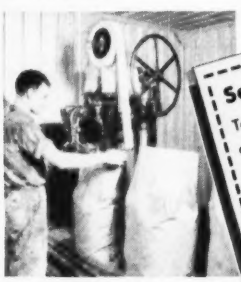
PALATKA, FLA. Hudson is the only Multiwall Sack manufacturer to guarantee its sacks against breakage on the filling or closing machines. The company has enough faith in its product to agree to replace without cost all Hudson Multiwall Sacks that fail on the purchaser's packing or closing machines.

Hudson's fully integrated operation provides the control of quality that such an unusual guarantee demands. Variations from outside suppliers are eliminated. To assure a dependable source of pulp Hudson owns and maintains 435,000 acres of choice timber. The strong, long-fibered Kraft is manufactured with laboratory controlled uniformity. The finished sacks (pasted, sewn, valve, or open mouth) are tailored to your most exacting specifications. And assured delivery is available by rail, truck, or water.

HOW HUDSON'S NEW GUARANTEE WORKS

When Hudson Multiwall Sacks are delivered into your custody, the company's new guarantee goes into full force.

All Hudson Multiwall Sacks must successfully pass your packing machines or be replaced without cost.



All Hudson Multiwall Sacks must pass your closing operations without failure, or Hudson will replace them.

Replaces Multiwall Sacks broken on your packer

NEW YORK CITY. "Our new guarantee to replace without cost every sack broken in packing and closing on your machines," stated T. H. Mittendorf, Hudson's Vice-President in Charge of Sales, "makes our Multiwall Sacks the most fully guaranteed in the industry. This is a big advantage to buyers because now they can count on using every sack they purchase."

T. H. Mittendorf

Mr. Mittendorf further explained, "Until Hudson introduced this new replacement policy, every user had to pay for his own losses for normal breakage on the packing or closing machines. But Hudson's new guarantee has changed all that. Now, when you use Hudson Multiwall Sacks, your original cost for sacks is your final cost!"

Urge Multiwall Sack users to write for facts

The Hudson Pulp & Paper Corp. invites all users of Multiwall Sacks to learn how they can benefit [illegible] using guaranteed Hudson Sacks. Examine [illegible] see this

Send for full details:

Tell me, without obligation, about the many advantages of your new Multiwall guarantee.

NAME

COMPANY

STREET ZONE STATE

CITY

[illegible] and [illegible] are promised!

Hudson Pulp & Paper Corp.
Dept. 153, 505 Park Ave., New York 22, N.Y.

fluctuates in supply in Japan, making it impossible to stabilize for the present either price or production. During the recent fertilizer year, therefore, ammonium sulphate, which is sold in 83 pound bags, ranged in price from $2.20 to $2.70 per bag on the domestic market, with export prices going about 10 per cent higher.

In the phosphatic fertilizers, given in terms of the most important Japanese product, superphosphate, annual production capacity runs around 2,500,000 tons. Output is still well below capacity. Japanese producers, however, have not been able to develop an adequate export market for this fertilizer in the Far East and thus will not likely increase production to capacity for some time. Price on Japanese superphosphate, since March 1952, ranges from $1.55 to $1.60 for an 83 pound bag. Unlike ammonium sulphate, the raw materials for which exist in Japan, superphosphate depends on imports of phosphate rock. Large imports have been coming from South Pacific islands such as Anaguar, and Japanese producers expect these imports to continue.

Japan also manufactures calcium cyanamide from domestic materials. Production capacity is 630,000 tons annually, but production has been running at around 400,000 tons. Producers claim that electric power shortages have been hampering production. The Ministry of Agriculture and Forestry, however, seems to be having some success in encouraging increased production. In September, 1952 calcium cyanamide output came to 51,000 tons, 114 per cent of the monthly goal. If this production can be continued, production in the new fertilizer year will run close to 600,000 tons.

Two new fertilizers are being developed in Japan, urea and synthetic fertilizer. Urea output now runs around 30,000 tons annually, and synthetic fertilizer about 270,000 tons.

Japan, depending as it must on exports to live, has made great efforts to sell its chemical fertilizers abroad. In prewar year, export of ammonium sulphate averaged 230,000 metric tons a year. In the fertilizer year just closed, August '52, ammonium sulphate exports came to 171,241 tons. Markets are in the Far East with the Republic of Korea leading the buyers with 78,566 tons, followed by Formosa woth 64,708 tons, the Philippines with 11,300 tons, India with 10,667 tons, the Ryukyus with 5,800 tons, and Thailand with 200 tons. The average price of these sales were $77.58 per ton FOB. September ammonium sulphate exports amounted to 42,683 tons, with Formosa taking almost the entire lot, 39,663 tons. The Ministry of International Trade and Industry, which governs Japan's exports, has set an export goal of 400,000 tons for the current fertilizer year. Stocks on hand, however, total 300,000 tons. But the Ministry feels that prices of ammonium sulphate have now been stabilized and production costs are down, with the result being pretty good export prospects.

Superphosphate export has not yet been successful. Small quantities have been shipped to New Zealand, the Republic of Korea, and Formosa, but Far Eastern countries generally do not seem to want this product. Domestic production at capacity can far outstrip domestic needs, and at one time there was an estimated 300,000 ton surplus. Production cuts, a decrease in next year's goal, plus price stabilization are expected to save the day for the superphosphate producers. Furthermore, large purchases through American assistance to the Republic of Korea will help use up some of Japan's current surfeit of superphosphate.

Since the adoption by Southeast Asian countries of the international bidding system in fertilizer purchase, Japan has been beleaguered by its own high prices. In September, Japan lost an ammonium sulphate sale in Formosa to West Germany. Japan's price was reported at $65 a ton against the West German price of $46 a ton. Realizing that the nation must export fertilizer since production capacity exceeds domestic sales, Japan hopes to hold a chemical fertilizer con-

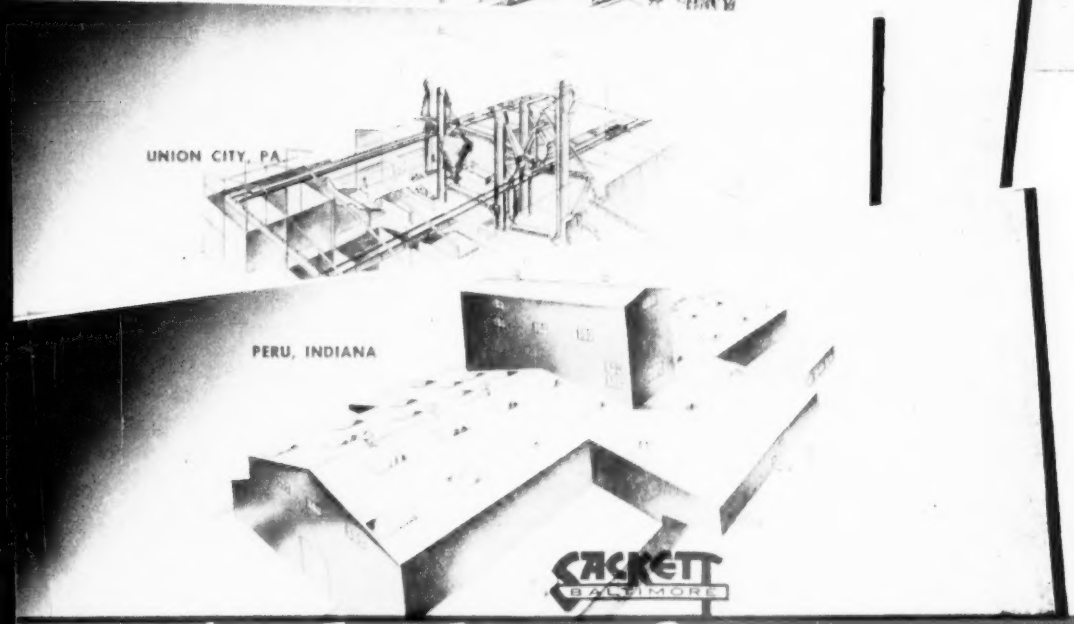
(Continued on page 70)

6 NEW PLANTS NOW UNDER CONSTRUCTION

These brilliant performers of advanced Sackett design will, upon completion, have a combined annual production capacity of well over 300,000 tons.

Each of these highly mechanized new manufacturing facilities adds further tangible proof to our long-recognized leadership in this particular field.

Superphosphate and mixed goods producers are invited to get our seasoned counsel on their expansion and modernization programs. It is available at no cost.



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DIVERSE PAPERS READ AS ASA MEETS WITH SOIL SCIENCE MEN

Too late for our last issue was the story on the joint meeting in Cincinnati of the American Society of Agronomy and the Soil Science Society of America, a five-day program which assembled a large group of agricultural scientists, from all over the world, and covered the whole wide front of agricultural progress throughout the world.

One of the high spots came during the first day's corn program in the talk by Roswell Garst, billed as a "farmer extraordinary", and brother to the banker who spoke at NFA. Here is the essence of what he said—and it sums up neatly what is going on in agriculture:

"We did a marvelous job with the horse for many years. Now we have only one term for energy—horsepower. Then two fellows came along—Rockefeller and Ford, who in 25 years utterly destroyed the effectiveness of 3,000 years of accumulated knowledge.

"For 2,000 years we have been studying the legume, and again we did a marvelous job. Again a guy came along—this time Harber—who discovered how to take nitrogen out of the air, and fix it in usable forms.

"So, if clover disappears in the next 25 years, as the horse has, nitrogen will do for soils what horsepower has done for energy."

The two associations elected their officers: ASA chose as president Dr. H. E. Myers, Kansas State College, whose picture is on page 24 of this issue. The SSSA chose as president Eric Winters, TVA, Knoxville.

The program which ran from Monday November 17 to Friday, November 21 was so rich in material we can only outline broadly what was covered.

ASA had a morning session devoted entirely to corn, and an afternoon session on agronomic education. That was Monday.

On Tuesday, ASA had a general morning meeting, while SSSA had their general meeting in the afternoon, and that evening a soil chemistry meeting, one on soil genesis, another on conservation.

While that was going on, ASA sections discussed breeding, crop production, weed control and woun ' up in the evening with a general meeting of crop science divisions.

Wednesday, SSSA divisions talked soil physics, soil chemistry, soil microbiology (this ran a whole day), soil fertility (which also ran a whole day) and Division V and XIII jointly discussed agronomic education.

Meanwhile the ASA crop science divisions met to talk breeding of wheat and barley, and oilseed crops: physiology, crop production, turf management. The agronomic education divisions had a breakfast, and a session on crop contests, and a general meeting.

Wednesday night everybody relaxed at the annual dinner which was featured by the presidential address, awards and recognitions.

This pattern, with variations, ran on through Friday morning.

OFFICERS AND DIRECTORS 1952-53

American Society of Agronomy

President, D. W. Robertson; Vice-President, H. E. Myers; Past President, H. P. Cooper; Editor, **Agronomy Journal**, C. W. Robocker; Secretary-Treasurer, L. G. Monthey.

Soil Science Society of America

President, L. A. Richards; Vice-President, Eric Winters; Past President, S. C. Vandecaveye; Editor, **SSSA Proceedings**, C. W. Robocker; Secretary-Treasurer, L. G. Monthey.

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KEY TO OUR STAFF PICTURES OF ASA MEETING

1. Advisory committee of Plant Food Research Committee had a breakfast meeting Nov. 18. Members and those attending shown here were: Malcolm McVickar, National Fertilizer Association, Washington, George V. Taylor, Spencer Chemical Co., Sam Gray, American Potash Institute, H. H. Tucker, Coke Oven Ammonia Research Bureau, Proctor Gull, Spencer Chemical Co., Borden Chronister, Nitrogen Div., Allied Chemical & Dye Corp. They discussed plans for the Plant Food Research Committee Program to be held at White Sulphur Springs, June, 1953. **2.** R L. Carolus, Mich. State College, E. Lansing, B. A. Krantz, USDA, F. E. Bear, New Jersey Agric. Experiment Station, M. L. Jackson, University of Wisc. **3.** M. V. Bailey, American Cyanamid Co., E. K. Walrath, Eastern States Farmers Exchange, Springfield, Mass. **4.** Hajime Iri, of Janan, Kansas State College, Manhattan. Tsutao Wang, of Formosa, who is traveling over the country as a student of agriculture. **5.** L. A. Richards, Pres., Soil Science Society of America, Soil Scientist, U. S. Salinity Lab., Riverside, Calif., Dr. H. P. Cooper, past president, Ameri Society of Agronomy, Dean Clemson College, Clemson, S. C., Dr. H. E. Myers, incoming president, associate Director Kansas Agric. Experiment Station, Manhattan, Dr. D. W. Robertson, Pres., Amer. Society Agronomy, chairman, Dept. of Agronomy, Colo. State College, Ft. Collins. **6.** A. D. Beasley, Mid-South Soils and Farm Service, Clarksdale, Miss., Dallas Cantwell, Atlanta, and Joe Culpepper, Kansas City, both of Spencer Chemical Co., Willis Stout, Kentucky Farmer, L. I. Jones, U. S. Dept. of Agric. **7.** Leo Orth, Minn. Farm Bureau, St. Paul, S. V. Milsted, Univ. Illinois, Urbana. **8.** Geo. Taylor, Spencer Chemical Co., Roswell Garst, of Iowa. **9.** John F. Davis, and R. L. Cook, both of Michigan State College, E. Lansing. **10.** D B. Hack, USDA, Washington, Vincent Sauchelli, Davison Chem. Corp., Baltimore. **11.** Dr. W. A. Albrecht, Chairman, Dept. of Soils, Univ. Missouri, Columbia, Dr. D. D. Long, International Minerals & Chemical Corp., Chicago, Ill., Garth Volk, Chairman Agronomy, Ohio State College. **12.** Ben Sklar, Allis Chalmers, Milwaukee, Dr. Roger H. Bray, Univ. Illinois, Soil Fertilizer Section, James NeSmith, Soil Science, Foundation, Lakeland, Fla. **13.** Jack Hester, Campbell Soup Co., Riverton, N. J., Richard Bradfield, Dept. of Agronomy, Cornell University, Ithaca, Dr. W. H. Pierre, Iowa State College, Ames. **14.** M. L. Jackson, University Wisconsin, H. P. Rhoads, University Nebraska, A. A. Nikitin, Tennessee Corp., Atlanta. **15.** D. W. Thorne, Utah State Agric. College, Wm. B. Martin, Ohio State College, Byron Shaw, Editor, American Society of Agronomy, Agric. Research Foundation. **16.** Ralph W. Donaldson, University Mass., Amherst, C. J. Chapman, University of Wisconsin, Madison. **17.** Z. N. Beers, Exec. Sec., Middlewest Soil Improvement Committee, "Dugan" Taylor, American Plant Food Council, Washington, W. C. Johnstone, Kentucky Bankers Association. **18.** L. G. Monthey, Exec. Sec. American Soc. of Agronomy, W. C. Robocker, Editor Agronomy Journal & Proceedings, Morrie Haag, Amer. Soc. Agronomy, Assoc. Editor, Crops and Soils. **19.** C. J. Willard, Ohio State University, Columbus, C. A. Lamb, Agric. Ex. Station, Wooster, Ohio. **20.** Frank Parker, U. S. Depart. Agriculture, L. A. Richards, Pres., Soil Science Society of America.

MORE STAFF PICTURES FROM ASA MEET

Safety

(PART 2) FIRE PROTECTION IN THE FERTILIZER INDUSTRY

By George G. Blair
Engineer, EBASCO Services

Left, George Blair, the author, and right, John E. Smith, Spencer Chemical, and president of the Fertilizer Safety Section.

Fire Protection Through Maintenance

Fire protection involves prevention, control and extinguishment. Even under the best protection plan some fires will start, and, despite considerable extinguishment facilities, some will get beyond control. A realization of these possibilities compels primary attention to the possibility of fire control as a major factor in any fire. Control means restricting the burning to the point of origin, without permitting spread beyond the limited area involved. Under ideal conditions of control, there would not be total destruction of a plant, and in fact, there should not be a large loss fire. By proper spacing of buildings, subdivision and segregation by fire walls and adequate protection of vertical openings in fire resistive buildings, the problem can be controlled at the design stage in new structures. However, changes made in well laid out plants either through ignorance or thoughtlessness may destroy a design benefit—or in a less desirable plant, convert a large loss probability into a total loss possibility.

Good design characteristics must be maintained, and less favorable situations should not be worsened. There should be no need to mention that frame additions increase the hazards—and the insurance cost—when added to masonry buildings, and that similar potentials are created when any inferior addition is added to a fire-resistive structure.

Care should be exercised to maintain proper clearances between buildings. When additions or new buildings are constructed between existing structures, the ability to limit a fire is impaired unless there is ample space, taking into account the type of construction, the size and the occupancy of all the buildings involved. Very often, such construction has made one large fire risk where but two small ones existed before.

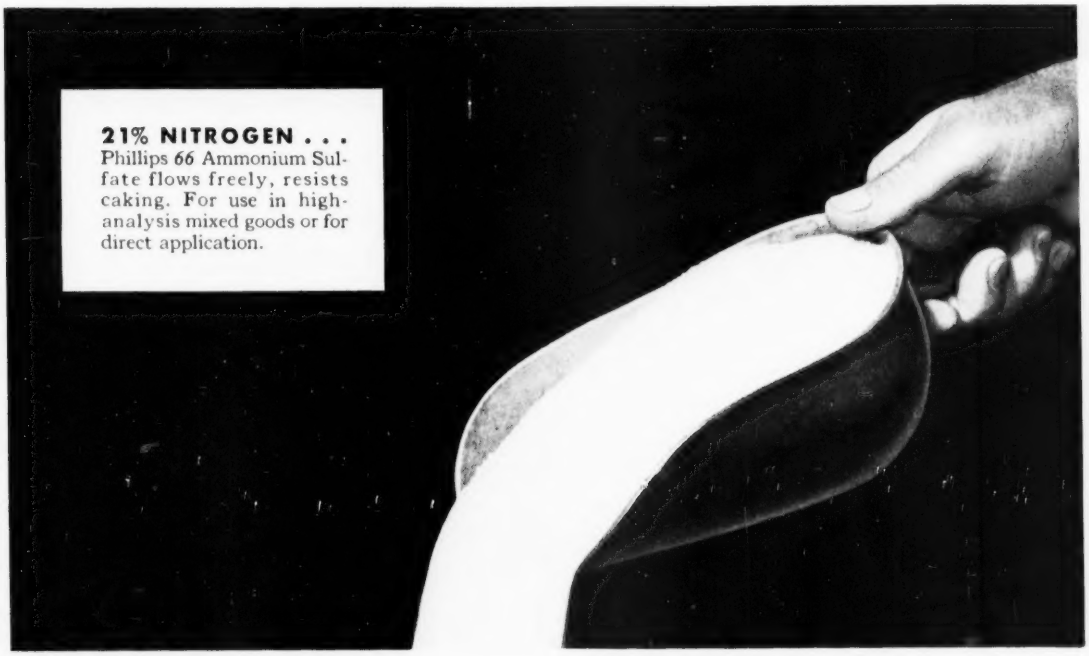
Fire walls should remain unpierced, or if openings are necessary, the effectiveness of the walls should be maintained by providing proper approved automatic or self-closing fire doors or shutters. Any pipe holes should be cemented or bricked tightly around the pipes.

Occupancy changes may lead to serious exposures. When a building has been erected specifically for a process, a change in the use of the area may lead to a serious exposure. This is especially true if less-than-fire-resistive construction was employed because original plans contemplated the storage or processing of materials of a non-combustible nature which were later changed to a more hazardous storage or use. Such a change may involve drastic modifications in the interest of maintaining safety. First, to maintain fire control features, it may be necessary to install automatic sprinklers when the occupancy becomes of combustible nature. Then, if vapor or dust condition is created, other necessary revisions could include a complete change in the electrical components to meet code requirements for dusty or explosive atmospheres. If the grinding or breaking of an incombustible material is changed to such an operation on combustible stock, magnetic protection should be required ahead of any grinder. Certain new fire walls or partitions may be advisable to segregate features of an occupancy changed to a more hazardous classification, and if the section happens to be sprinkled, increased water requirements might result.

While a recitation of these unfavorable possibilities illustrates that the use of common sense would compel a decision against such changes, or for proper safeguards if the changes are made, there is a surprising occurrence of such poor practices. A large part of the maintenance of fire protection consists of vigilance in **maintaining** the integrity of existing structures, segregation and occupancy.

Prevention through the elimination of fire causes is perhaps the easiest method of damage reduction, but there are innumerable conditions and remedies requiring constant watchfulness. In the present national loss statistics, fertilizer plants are included under the general classification of chemical

It's a Good Mixer!



Nitrogen is in great demand. Even Phillips tremendous capacity isn't equal to today's requirements. But we're making four different kinds of high-quality nitrogen material for mixers and farmers.

1. AMMONIUM NITRATE . . . Phillips *66* Ammonium Nitrate contains 33% N. Small, coated, uniform pellets flow freely and resist caking.

2. NITROGEN SOLUTIONS . . . there are three Phillips *66* Nitrogen Solutions for use in the preparation of high-analysis fertilizers and the ammoniation of super-phosphate. These solutions keep handling costs low . . promote rapid, thorough curing.

3. ANHYDROUS AMMONIA . . . Phillips *66* Agricultural Ammonia contains 82% N. Convenient, economical source of nitrogen for fertilizers.

4. AMMONIUM SULFATE (see photograph and description above.)

For full information write our nearest district office.

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HOUSTON, TEX.—604 City National Bank Bldg. • AMARILLO, TEX.—First National Bank Bldg. • OMAHA, NEB.—WOW Bldg.
PASADENA, CALIF.—604 Citizens Bank Bldg. • NEW YORK, N. Y.—80 Broadway • BARTLESVILLE, OKLA.—Adams Bldg.

plants, and the exact fire record of the business is somewhat vague. However, in this class, over 70% of the fires are attributable to common and special hazards such as: spontaneous ignition and overheating, electrical misuse, smoking and matches, grinding or mixing, defective heating equipment. The known fires in the fertilizer industry follow this pattern.

Too frequently exact causes are not determined, but among the more frequently noticed defects or departures from Underwriters' standards in fertilizer plants are such miscellaneous faults and practices as:

More than a one day supply of oxidizing, decomposing or spontaneous heating materials in the main building.

Wooden lockers or lack of metal lockers where needed.

No standard waste cans for rags and similar materials.

Grease on floors and equipment supports.

Unslaked lime, garbage tankage, sludge and similar materials in contact with wood, on wooden floors, or incombustible bins.

Dynamite improperly stored.

Open trash and bag burning.

Lack of approved mufflers on tractors and fueling of tractors inside.

General heating equipment deficiencies are chiefly:

Salamanders or stoves used.

Stovepipes and stove and dryer clearances.

Unapproved oil burners and gravity oil feed.

Unguarded radiators or pipe coils.

Electrical installation hazards are chiefly:

Defective electrical extensions.

Motors not of dust proof type.

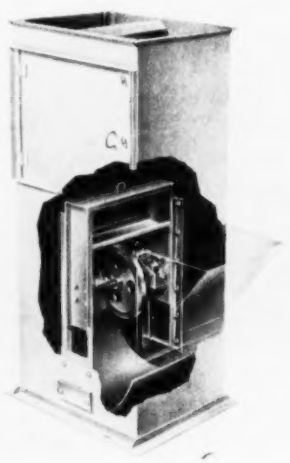
Corroded electrical system components.

In most of the foregoing, the remedy is obvious once the defect is recognized, but some explanation may be pertinent.

Materials that may intensify a fire or that are subject to heating should be kept in their proper segregated storage areas and brought out for use only as needed to meet requirements. To facilitate operations, a one day supply of such materials is generally allowed in the processing areas, thus assuring that all of that in the main building will be used each day. Nitrates are among materials so considered, and the rule is to segregate them properly. There is no question that some nitrate will burn, and others will decompose under fire conditions to yield oxygen and oxides of nitrogen which increase the intensity of a fire and emit fumes which may complicate fire fighting. The fume liabilities in the event of a fire should also be guarded against when ammonium nitrate in an ammoniating solution is introduced in or stored near a building. Tanks for such material should be properly designed, not located near other equipment of combustible nature, and provided with safety relief and control valves at the tank as well as at the point of use.

Materials subject to spontaneous heating or heating when damp should not be permitted anywhere except in incombustible bins or vaults. This generally applies to various organic materials and to unslaked lime. There have been several fires which started in or near such materials.

This new, long-life and maintenance-free automatic take-up and water-tight elevator bucket boot has just been introduced by Beaumont Birch Co., Chemical Handling Division, 1505 Race Street, Philadelphia 2, who will gladly give you full information on this forward step by their research people.



As to dynamite or other explosives—The dynamite, if used, and detonators should be separately and remotely stored. Underground vaults with substantial but unattached covers, with all metal parts bonded and grounded and without heat or light devices inside, perhaps offer the best protection.

Greasy clothing in wood lockers and strike-anywhere matches in clothing in lockers have caused fires which would have been coinfined to the locker contents if substantial metal lockers had been provided.

Oily rags and other trash belong in covered cans until safe disposal. In fact, it is good practice to have covered metal cans or metal lined bins with self-closing tops for clean wiping rags and similar materials.

Where steam pipe coils or radiators are used for heating at floor level, they should be provided with screen guards whenever they are subject to use as clothes drying racks.

Bearings, conveyor systems and elevators must be maintained in proper alignment and properly lubricated and cleaned to avoid frictional overheating as a fire source, and loading, dumping, mixing and filling areas and elevator heads and pits should not be overlooked in the general plant housekeeping.

There should be no need for makeshift heating arrangements such as stoves or portable devices in any new plant, but where stoves are used, there are well established standards for their arrangement, and for proper clearances, including those for stacks and vents. Oil fuel devices should bear the label of Underwriters Laboratories, with any oil storage conforming with the NFPA Flammable Liquids Ordinance. Portable oil heaters should never be filled while in service; this is a rule freely treated with contempt, frequently with disastrous results. In general, stoves should be substantially set on legs

(Continued on page 70)

MEMO TO: Fertilizer Manufacturers

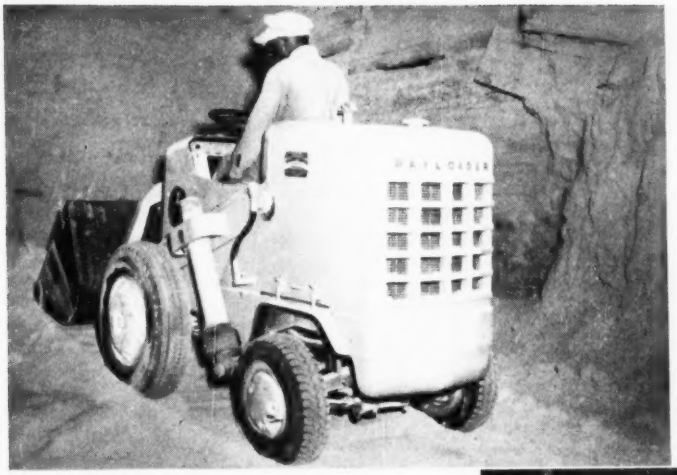
Fertilizer in Cotton Bags is *in demand* because Cotton Bags SAVE container cost by supplying a premium of valuable cotton cloth for sewing.

Farm families today know, through advertising in leading farm magazines, that with each *ton* of fertilizer in Cotton Bags they'll receive 21½ yards of sewing material!

And farm wives have literally hundreds of uses for Cotton Bags. They use them for — dresses, towels, aprons, slipcovers, luncheon sets, curtains -- even underwear! (Cotton Print Bags used for 1 ton of fertilizer will make 5 new dresses!)

YOU can sell *more* fertilizer by packing YOUR BRAND in Cotton Bags!

NATIONAL COTTON COUNCIL Box 76, Memphis, Tenn.



IN BINS

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BOXCARS

PAYLOADERS

Blast Bulk Handling Costs

Scoop-up? Carry? Dump? Spread? Load? Pile? Pour? . . . "PAYLOADER" tractor-shovels will do all of these bulk material handling jobs for you and many more . . . up to three tons at a time . . . travel at speeds up to 28 miles per hour . . . work inside buildings or outside on pavement or ground.

"PAYLOADERS" bring a combination of speed, low cost, flexibility and versatility to your bulk-handling problems unmatched by any other type of equipment. Thousands of "PAYLOADER" installations in all kinds of plants and situations have accomplished tremendous cost reductions through savings in time and labor and through increased production.

Our broad experience, plus that of your Hough Distributor, is available to help solve your bulk material handling problems, and without obligation. The Frank G. Hough Co., 702 Sunnyside Ave., Libertyville, Ill.

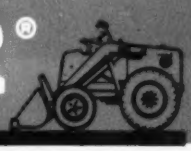
FREE HANDBOOK

Tells how and where to look for signs of inefficient bulk materials handling . . . how to analyze, organize and set up an efficient handling system. Plus many useful tables and data. Write for "Bulk Materials Handbook."

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. SINCE 1920



NATIONAL

American Cyanamid's 42 plants participated in a five-week program of safety, which ran through November and into December, with the idea of bettering last year's exceptional safety record, company-wide. **S. F. Spence,** director of safety and fire prevention says last year's results came from the enthusiasm of the employees themselves in promoting safety. Special safety posters, and detailed programs will highlight good housekeeping, fire safety, personal protective equipment, safety practices, on the job and off the job safety throughout the year.

* * *

Ethyl Corp., in collaboration with **Battelle Memorial Institute,** have developed alpha-cyano-beta (2,4-dichlorophenyl) acrylic acid, which is a new plant-growth regulator now being green-house tested. It has been trade-marked **Ethyl 214.**

CALIFORNIA

Wilson and George Meyer Co., San Francisco, will act as sole agents for the output of the **Western Phosphates** plant when completed late this year. The plant, a $5,000,000 operation is being built at Garfield, Utah, and is the joint operation of **Stauffer** and **Garfield Chemical,** as reported here last month.

* * *

Stauffer Chemical has control of **Consolidated Chemical Industries,** owner and operator of 8 plants, through the purchase of additional shares, bringing up to 99¼% Stauffer's holdings of CCI class B common voting stock.

FLORIDA

Wilson Toomer, Jacksonville, is running a series of advertisements in the Florida area praising the work of the AES and its research into various phases of the State's agriculture. Those who attended the NFA convention in Miami Beach will recall the recital by Director **Willard M. Fifield** of the results of this research.

On December 19 a sulphur dust explosion tore pieces out of the Wilson & Toomer Jacksonville plant roof, and blew out windows. Total damage about $1,000. Apparently a piece of metal fell into the sulphur on the elevator conveyor.

* * *

International Minerals & Chemical plant, being built at Bonnie, is founded on sand, but the sand is compacted by Vibroflotation by the **Rust Engineering** people. The method is expected to save a quarter million dollars, because otherwise it would have been necessary to go down 60 feet to suitable bearing strata. The new phosphate plant will cost some $12,000,000.

* * *

Tech Research Foundation, Miami non-profit group for the development of Miami resources, has imported a $10,000 grinding outfit in an effort to prove to area municipalities that trash and garbage can be converted into fertilizer. **Russell N. Edwards** is president of the Foundation.

* * *

Foremost Fertilizer, Leesburg, were hosts recently to a group of Explorer Scouts, who were conducted through the plant by **Herbert Carlton.**

* * *

F. S. Royster has been granted a 45% certificate of necessity for a $3,000,000 phosphate plant to be built near Bartow.

IDAHO

Monsanto began production of elemental phosphorous last month at the Soda Springs plant, complete after 18 months of work. The plant is planned to produce about 9% of U. S. production, under the direction of plant manager **J. E. Gurvin.**

KANSAS

Consumers Cooperative entertained several thousand farmers from a nine-state area December 3 when they laid the cornerstone of their new $15,000,000 plant at Lawrence, which is slated for completion by 1954. The ceremony was part of the annual meeting of the co-op, and a fleet of busses transported the delegates from the convention site to the plant site. Distinguished speakers were on the program, and 4-H club members conducted a flag-raising ceremony.

LOUISIANA

Cook Chemical Co. of Kansas City, Missouri will set up two new insecticide operations in Baton Rouge with a total investment of a million dollars: **Chemical Solvents Co.** and **Kan-Jax Chemical Co.**

* * *

Pronto Liquid Fertilizer Corporation, Eunice, has been chartered with capital stock of $250,000.

MARYLAND

Mathieson Chemical, Baltimore have donated the awards to be made to former 4-H club members in a national program of recognition of adults, formerly 4-H members, who have had good records as citizens. They will present a 10-karat gold key, a trip to the annual 4-H Congress of 1953, and entertained 4-H leaders and other adult guests at a buffet breakfast, during the 1952 Congress.

This is the new straight-line production plant designed and built for Link-Belt at Colmar, Pennsylvania by The Austin Company. It contains 300,000 square feet of floor space, and is the last word in the production of custom-designed conveying and processing machinery.

Around the Map

MINNESOTA

J. C. Boote, Worthington, has announced a $30,000 anhydrous ammonia distribution operation, including an office, large warehouse and two 30,000 gallon storage tanks.

MISSISSIPPI

Gulf Development Company has chosen **Chemical Construction Corporation** to handle construction design and engineering for its $15,000,000 ammonia nitro phosphate plant at Pascagoula.

* * *

Bobo Fertilizer Company, Inc., Clarksdale, has been incorporated with a capital stock of $25,000.

MISSOURI

Monsanto, St. Louis, are about to go into production on an improved herbicide, called MCP-90 because it contains 90% 2-methyl-4-chlorophenoxyacetic acid. They point out that because of the high percentage of active isomers, the new product will reduce waste of material in formulation, and that precipitation in hard water is virtually eliminated.

NEBRASKA

Lincoln Service and Supply Co., Grand Island, are constructing a new building there and establishing at Falls City a new company to be known as **Falls City Fertilizer, Inc.** Headquarters remain in Grand Island. Officers are identical for both concerns.

NEW MEXICO

International Minerals & Chemical plans a substantial addition to its sulphate of potash facilities at Carlsbad, **A. Norman Into,** vice president in charge of International's Potash Division, has announced.

"The site of the new plant has been laid out already and construction will start without delay, probably within the next few months," Mr. Into stated. "The plant will be in production around the beginning of 1954. Added production will amount to approximately 35,000 annual tons of sulphate of potash.

NEW YORK

Cooperative Grange League Federation Exchange, Inc. has been authorized by its Board to build a new fertilizer plant at Big Flats. Details have not been announced.

* * *

American Israel Chemical Corporation, New York, has been chartered with a capital stock of $1,000,000 by **Cynthia F. Chasan, Marie Rotonde** and **Edward Goldenberg, Jr.** to produce fertilizers and other chemicals.

OKLAHOMA

Schrock Fertilizer Service of Congerville, Illinois, is opening a branch at Enid, with anhydrous ammonia facilities, the first in that community.

* * *

Monarch Fertilizer Company, Muskogee, has been chartered with capital stock of $200,000 by **Chas. A. Hoirich, K. A. Schmitt** and **W. H. Gilder.** Monarch, headed by Mr. Schmitt, has facilities now in Tulsa, Bartlesville, Pawhuska and Ponca City.

PENNSYLVANIA

Sinclair Refining has in operation a new sulfur extraction unit at its Marcus Hook refinery, with a capacity of 21 daily tons of molten sulfur by conversion of hydrogen sulfide.

TENNESSEE

Armour Fertilizer is wating for rezoning to permit the building of the $500,000 plant they have planned for Memphis. This permit rests on assurance to the neighbors that no bad odors will result.

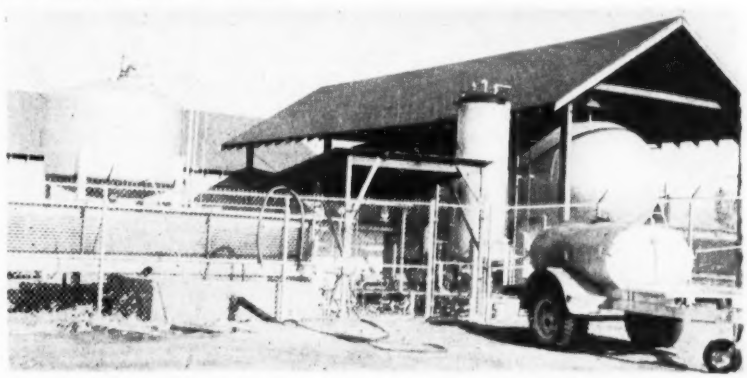
* * *

Covington Fertilizer Co., Covington, has been granted a five-year $40,000 loan by RFC as the only anhydrous ammonia distributor in Tipton and Crockett Counties. The loan will refund a previous RFC loan, buy $20,000 worth of equipment and provide $17,500 operating capital.

* * *

Virginia-Carolina's Mt. Pleasant plant is in process of modification, with new equipment, storage, lighting circuits, conveyors, rail facilities, fire protection equipment—and an extension of 40 feet on the building.

Agricultural Products Company, Mequite, New Mexico, use this equipment for the application of anhydrous ammonia to the irrigation water of growers in their area. Their local farm practice is to grow cotton when water is short, alternate with alfalfa when irrigation is normal.



What You Need, Mister, is PRODUCT CONTROL!

YOU DON'T NEED TO CONTROL YOUR TEMPER when you rely on Aquafil for product control. Aquafil makes it possible for you to market a better mixed fertilizer that is uniform . . . bag by bag. With Aquafil you no longer need to worry about "bag-setting" and costly reprocessing. Find out today about this new stabilizer for all mixed fertilizers that builds bigger profits for you.

YES SIR . . . GET ALL THE FACTS . . .

AQUAFIL

Product Stabilizer

One hundred pounds of Aquafil will do the same job as 400 pounds of old fashioned conditioners.

Learn How You Can Reduce Production Costs with

AQUAFIL *Send This COUPON TODAY*

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96 B Avenue N.E., Cedar Rapids, Iowa

Please send me, at once your new folder telling how I can up profits in my mixed fertilizer operations.

Name .....

Address .....

City ..... State .....

TEXAS

Armour Fertilizer Works, Dallas plant, is marketing granulated plant food from its recently installed "pebble" equipment.

* * *

Gulf Oil now has in operation its new sulphur recovery unit at Port-Arthur—extracted from refinery gases.

* * *

Tex-Ide Chemical Corp., San Marcos, has announced its officers: President, **J. H. Hinkle, Jr.;** vice-president, **Dr. Louis E. Buck;** secretary-treasurer, **E. S. Smith.** Tex-Ide has bought the **Great State Chemical Co.** which produces both fertilizer and insecticides. A new type of larvaecide will be introduced.

VIRGINIA

The Staunton lime plant, operated by the State Department of Agriculture will be shut down this month and next to put in a power conveyor system, permitting additional annual production of 20,000 tons.

WASHINGTON

Spokane Chemical Company, Spokane, has been formed for the manufacture of fertilizer from phosphate rock and will build a processing plant. The company was incorporated for $1,000,000. **Harold W. Coffin** is acting as spokesman for the group of five who established the concern: **F. C. Rummell, Howard C. Paulsen, D. W. Walter, Alan G. Paine** and Mr. Coffin.

WISCONSIN

Kickapoo Fertilizers, Hillsboro, a division of **Midwestern Phosphate,** Madison, will have a mixed fertilizer plant in operation by the middle of next month. **James P. Menn** has been made sales manager of the new operation.

* * *

Milwaukee Sewage Commission has issued warnings to others using the suffix **"organite"** in their fertilizer products that these names may sound too much like **Milorganite,** the Milwaukee trade name.

AUSTRALIA

Imperial Chemical Industries of Australia and New Zealand are spending half a million Australian pounds to increase production and step up research on insecticides and herbicides. A new biological laboratory is to be built.

AUSTRIA

Linz Nitrogen Works in September produced 36,195 metric tons of nitrogenous fertilizers, of which 25,970 tons were exported, chiefly to South Korea.

BELGIUM

The Union Chimique Belge, Brussels, has developed a new product called **Aglusol,** which is reported to have the same property of holding top soil against erosion as natural humus, and is resistant to harmful soil bacteria. Costs are still high, but the concern expects to bring them within reach of the farmer soon.

CANADA

Western Potash Corporation, Calgary, a Canadian company, has been formed to work what is called a "fabulous" potash bed, seven miles long and 17 feet thick in western Saskatchewan. The concern has the right to explore 218,540 acres. **Potash Company of America,** which is developing New Mexico beds, holds prospecting rights on 175,000 acres in the same area, and is conducting explorations. **Liberal Petroleums Ltd.,** Calgary, has announced a large potash discovery in the Palo area of Saskatchewan, 25 feet thick at a depth of 3,800 feet. They have permits covering 100,000 acres.

COLOMBIA

The $10,000,000 synthetic ammonia and nitrogen plant reported here in December will be constructed by **Chemico** according to later word from the Colombian government, whose **Instituto de Fomento Industrial** is building the new plant.

FORMOSA

The Kaohsiung ammonium-sulfate plant is expanding from 7,000 to 60,000 tons. The **Taiwan Fertilizer Manufacturing Corp.** has stepped up its production of fertilizer.

* * *

China News reports that 1953 fertilizers for the rice crop have already been distributed, earlier than usual to encourage farmers to use basic fertilizers instead of top dressing only.

ITALY

Montecatini's plant at Novara has just brought into production a new unit, first in Italy to use the methane method. It has an annual capacity of 35,000 metric tons of nitrates, and will produce 45,000 metric tons of ammonia nitrate and 35,000 tons of ammonium sulphate, plus urea and other nitrates for industrial use.

The Montecatini plant at Ferrara will shortly come into production with another methane plant, capable of 50,000 annual metric tons of nitrate.

JAPAN

Sumitomo Chemical Co., Ltd. Niihama, now in operation is to triple it capacity. **Chemico,** which designed the original plant is engineering the new capacity.

MEXICO

Gulf Sulphur not only reports the finding of the fourth rich sulphur deposit on its Mexican properties, but that its reserves on the Isthmus of Tehuantepec are almost quadruple previous estimates.

* * *

Stauffer de Mexico, Nogales, Sonora, opened its new pesticide plant with a reception December 11.

NORWAY

Norsk Hydro, Oslo, is borrowing 3,750,000 pounds to finance expansion of its complete fertilizer, urea and magnesium production.

They plan large scale expansion of production of ammonia and urea and expansion of elemental phosphorus, magnesium and calcium carbide production facilities.

* * *

A new sulphur pyrites mine at Skorovas has begun production. It is expected to yield 150,000 annual tons of 51% ore. A 28 mile cableway transports the ore from the mine to the shipping terminal.

LIGHTNING PRODUCES FERTILIZER, TOO

Nature's fireworks — by transforming the inert nitrogen in the air to nitric acid — produce much more fertilizer per year than do Chemico-built plants. But lightning scatters its benefits without consideration for those who need them. Chemico-built plants, on the other hand, produce the kind of commercial fertilizer you want . . . where you want it . . . when you want it . . . in the concentration you want . . . at a very reasonable price.

Chemico offers a complete engineering and contracting service to the fertilizer industry, ranging from the design and contruction of complete fertilizer works to furnishing small individual units and auxiliary plants of a specialized nature. From Pittsburgh to Pakistan, from Colombia to China, Chemico has been building such plants since 1914. Chemico brings to each new project a wealth of experience, proven methods and guaranteed performance.

If your plans include the production of nitrates, superphosphates, double superphosphates, ammonium phosphates, mixed salts or any other commercial fertilizers, it will pay you to discuss your specific problems with Chemico.

CHEMICAL CONSTRUCTION CORPORATION

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TECHNICAL REPRESENTATIVES: CYANAMID PRODUCTS LTD., LONDON • CHEMICAL CONSTRUCTION (INTER-AMERICAN) LTD., TORONTO • SOUTH AFRICAN CYANAMID (PTY) LTD., JOHANNESBURG

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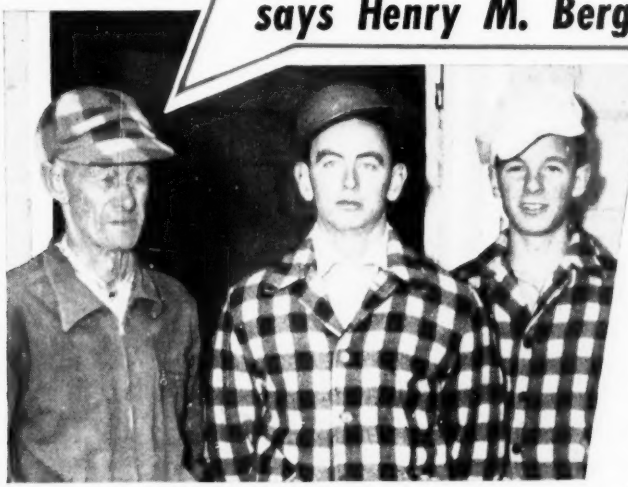
Chemico plants are profitable investments

"10-10-10 fertilizer more than doubled pasture production"

says Henry M. Berg, Blanchardville, Wis.



Mr. Berg is shown here on his farm with two of his three sons, Robert (center) and Duane (right).

With results like this, it's easy to see why Henry M. Berg of Blanchardville, Wis., calls his use of 10-10-10 complete fertilizer on pastures "the best investment we ever made."

In 1951, Mr. Berg and his sons applied 10-10-10 to his pastures at the rate of 560 pounds per acre and fenced off a portion as a test plot. The yield per acre on this fertilized plot was 8,025 pounds against 3,750 pounds of dry matter on unfertilized fields. The unfenced portion, used for pasture, furnished fresh grass for cattle all summer long.

In 1952, 250 pounds of 10-10-10 were used and the results were approximately the same.

Bigger yields for farmers mean better business for you

● Pastures are only one place where application of high-nitrogen complete fertilizers pays off. Corn, small grains, orchards and many other crops respond with equally impressive yields.

As more and more farmers discover how profitable an investment in high-nitrogen fertilizers can be, demand for them will go up and up. Meet this demand among your customers with the finest high-nitrogen fertilizers you can mix, and that means fertilizers that get a major share of their nitrogen content from U·S·S Ammonium Sulphate.

Dry, free-running U·S·S Ammonium Sulphate gives equally outstanding performance in mixing and in use. Since its nitrogen is in the ammonia form, it won't leach out during spring rains, yet converts to readily available form in the warm, moist growing season.

For complete information on U·S·S Ammonium Sulphate, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

U·S·S AMMONIUM SULPHATE

USS

3-99

UNITED STATES STEEL

FERTILIZER AND *Conservation*

By Malcolm H. McVickar, Chief Agronomist, NFA

Felix D. Summers, an artist in the U.S. Soil Conservation service won the top award in a national contest sponsored by the Soil Conservation Society of America for this conservation emblem.

Today, the value of the dollar is a common topic of conversation, of course, along with the usual political chatter that precedes a national election. In fact, the value of the dollar is a favorite topic of some of our political leaders. There are those, and their number is large, that predict that America cannot long survive continued inflation. Thus, it seems appropriate for us to get our feet on the ground and take a look at our real resources. Basically, our real wealth lies not in the number of dolars in circulation or in the tempo of the stock market but in our national resources available to provide an abundant life. The cornerstone of better living is better food, feed and fiber. A continued supply of these is primarily depentent uponthe availability of plant nutrients to produce them.

Our land is our most valuable heritage. It is the very foundation of our existence and our progress.

DEATH RATE PER 100,000 POPULATION VS FERTILIZER USE, 1946
(Federal Security Agency — Public Health Figures)

STATE	Heart Disease	Cancer and Other Malignant Tumors	Fertilizer Use Rank
North Carolina	183.5	69.3	1
Georgia	189.5	78.0	2
South Carolina	185.4	70.0	4
Virginia	249.1	92.7	8
United States	306.8	130.1	

Productive lands are symbolic of healthy and strong nations; likewise, poor lands are symbolic of weak and starving countries. Thus, in this period of emergency, we can only remain strong if we maintain the productivity of our soil.

When the early settlers established themselves here they found one of the richest banks the world had ever known. The bank to which I refer is the "Soil Bank of America." Let's take a look at this bank and analyze both its liquid assets as well as its reserves. The real wealth of a bank is determined by the ratio of assets to liabilities. Likewise, the value of our soil bank is determined by its ability to produce crops with its liquid assets — the available plant food.

Some hundred years ago many of our people became concerned because the liquid assets of our soil bank were being depleted with alarming rapidity. They looked around to find a means of replenishing the vast quantities of plant food leaving the soil in harvested crops. They found a sort of answer in the use of organic wastes such as tankage, bones, etc., but within a short time science gave a much better solution. Frozen reserves already existing in nature could be treated and turned into liquid useable assets. Thus, the chemical fertilizer industry was born.

Fig 4 Plant food removal exceeds replacement

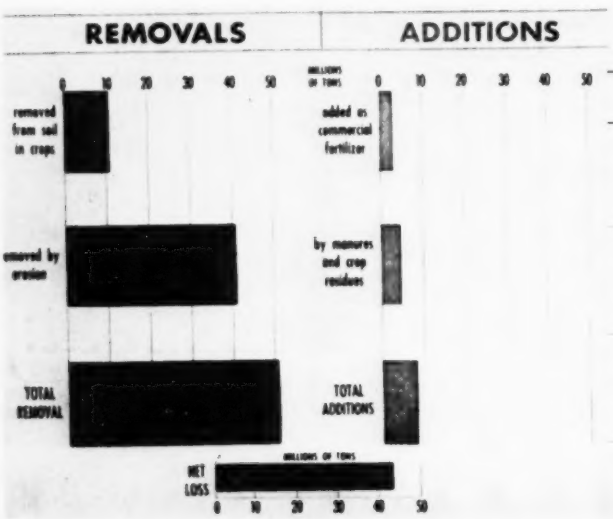
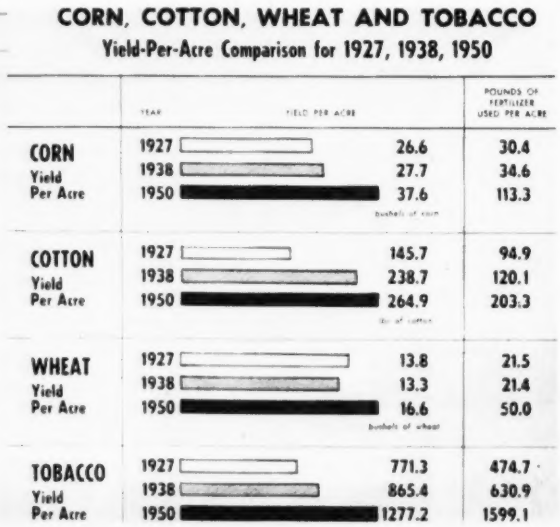


Fig 5 Yields and fertilizer use rise together



I wish to discuss the role played by chemical fertilizers. None other than one of the very able members of this Society, Firman E. Bear, has said, "The fertilizer industry represents the most important advance ever made toward providing plenty of food for the peoples of the earth." Of course, to get the most out of fertilizers, their use must be coupled with other good management practices such as adequate land preparation, the use of good seed and by all means the control of water and wind erosion.

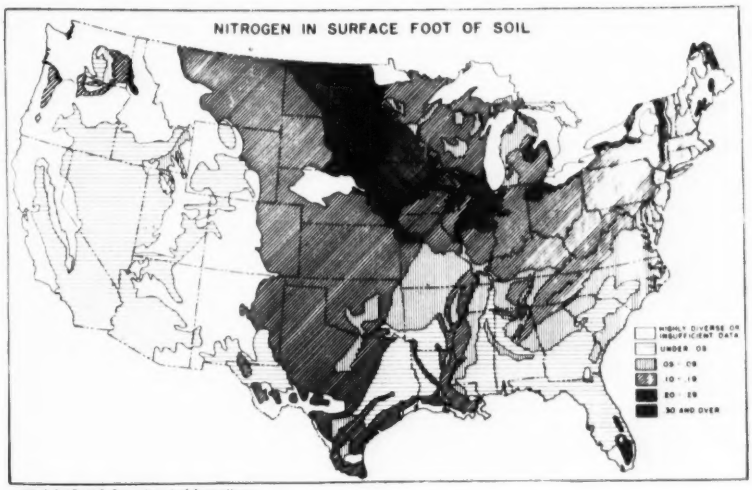
Figures 1, 2 and 3 show the average amount of nitrogen, phosphoric acid and potash in the surface foot of soil for the different areas. Fertilizers are used to replace the plant food removed by crops or lost by erosion. Thus, it is only natural that the heaviest consumption of chemical fertilizers would be concentrated along the eastern seaboard where the soils are low in native fertility.

In 1951 American farmers used approximately 19,000,000 tons of commercial fertilizer. This great volume, if carried in 40-ton railroad cars, would reach from the northern part of Maine to the southern tip of California. It would appear that the plant food contained in this tonnage and returned to our land last year would be equal to, or greater than, that removed. However, as shown in figure 4, this is far from being the case.

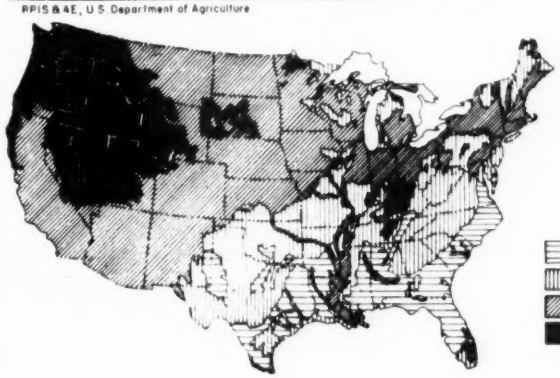
The fertilizer industry is particularly proud of the progress that has been made in increasing the plantfood content of mixed fertilizers. The concentrated product furnishes plant food cheaper to the farmer because of the savings in labor and in transportation charges. In 1920 the average plant-food content for each 100-pound bag was 13.9 pounds of nitrogen, phosphoric acid and potash. By 1949 the plant-food content had increased to 22 percent and it is more than 23 percent today.

It is also interesting to note what has happened to farm production during the past 20 years. During this period, the per-acre yield of corn has increased 36 percent; the

(Continued on page 74)

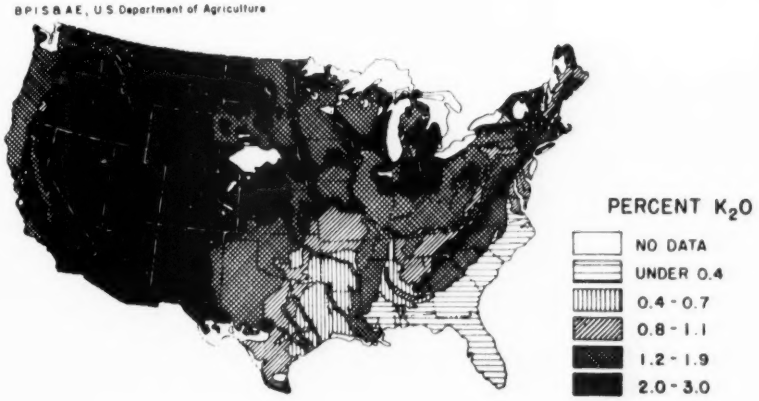


BPIS & AE, U.S. Department of Agriculture



PHOSPHORIC ACID IN SURFACE FOOT OF SOIL

BPIS & AE, U.S. Department of Agriculture



POTASH IN SURFACE FOOT OF SOIL

BPIS & AE, U.S. Department of Agriculture

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.

REG. U. S. PAT. OFF.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 48/52% K_2O
MANURE SALTS 20% K_2O MIN.

Going against the grain of the land, contour farming, is the farmer's way of assuring bumper crops, and bumper profits, for the future. To preserve his way of life, he must preserve the land that provides for him.

The secret of peak production lies in the soil, the ultimate source of all animal and vegetable growth. Daily, vital plant-food elements are drained from the land to meet the demands of growing crops. Fertilizers help restore these elements.

Many of the most effective soil-replenishing fertilizers contain POTASH, often Sunshine State Potash, a product of New Mexico. Potash adds the vital food elements that help crops resist disease and drought—strengthen the soil for future bumper crops. Yes, Potash, a valuable profit building aid, proves a good business investment.

UNITED STATES POTASH COMPANY, Incorporated, 30 Rockefeller Plaza, New York 20, N. Y.

The newest, best multiwall bags for valve-packing your fertilizer . . .

Bemis B-FLEX Valve Bags!

You should switch to Bemis B-FLEX promptly because . . .

1. LOWER BAG COSTS. You'll save up to $4 per thousand compared with conventional inner-sleeve valve bags.

2. LOWER PRODUCTION COSTS. Faster handling on your packing machines.

3. FASTER PACKING. Are jam-ups a problem? Not with Bemis B-FLEX. No flapping inner-sleeve to slow down material flow.

4. UNIFORM WEIGHTS. You can hit your weights "right on the button." Stop over-packing.

5. CLEAN PACKAGE. Minimum sifting.

6. BETTER CUSTOMER SATISFACTION. No loose, torn sleeves to get into the farmer's drill.

And, of course, you get the added benefit of Bemis' crisp, bright, multi-color printing — the finest printing your brand can have on multiwall bags.

Ask your Bemis Man for the complete B-FLEX story.

Bemis

BAG COMPANY

General Offices
St. Louis 2, Mo.

Sales Offices in
Principal Cities

Mostly Personal

Lee Ashcraft has become chairman of the executive committee of **Ashcraft-Wilkinson Co.**, Atlanta while **George W. McCarty** moves up to board chairman, and **Van W. Wilkinson** becomes president.

* * *

Fred F. Coffee, Jacksonville, after 45 years with **Armour Fertilizer** and **S. F. Lipscomb**, Bartow, completing 36 years with them, have retired.

* * *

Bachman S. Smith, Naco v-p and manager of their Charleston, S. C. plant, retired December 31 after 47 years in the industry, all of it in Charleston. He has been succeeded as plant manager by **Frank A. Wilson.**

* * *

H. H. Bomar has been made director and executive vice-president of **Jacksonville Fertilizer.** Jacksonville, Texas, of which **J. T. Carlisle** is president. The plant has been streamlined with new equipment and extensive repairs, and has a daily capacity of 150 tons. The concern is 15 years old.

* * *

Richard M. Barton, who recently joined Ethyl Corp. after 3 years as agricultural chemical sales manager for **Innis, Speiden & Co.** has been made a chemical sales representative, with headquarters in Atlanta, Georgia.

* * *

Ewell C. Orme has become president of **Standard Chemical Company**, Troy, Alabama, succeeding **E. L. Boatner**, resigned. **Fred C. Broadway** has been made secretary-treasurer, and general manager.

* * *

John E. Naylor, with **Dupont** for 10 years and a specialist in the field of farm chemicals, has been made assistant district sales manager of the San Francisco office of the **Grasselli** department, assisting district manager **C. E. Graves.**

* * *

William E. Chace, NFA's director of information, was missing from the convention. Now we know why. Bill is the proud dad of David Christopher Chace, born during the convention. Bill says David "is in fine shape, and sends his kindest regards".

* * *

Anton Waldin, Jr., who for the past five years has been with **F.E.C. Fertilizer**, Homestead, Florida, as plant superintendent, has been employed by **Dawal Farms**, Princeton, Florida, to build and operate a fertilizer plant for them near their big tomato packing house. The plant is to be 140 by 125 feet, of concrete and steel, and Mr. Waldrin writes he hopes it will be in operation by July.

* * *

N. M. Sloane has been made sales-manager of the newly created mid-Western sales division of **Arkell & Smiths**, and will make his headquarters at 205 W. Wacker Drive, Chicago. He came from their Central Sales Division where he was a sales representative.

* * *

John K. McIntyre has been appointed sales representative in the

S. K. Bradley, who has been elected vice president of multiwall bag sales for Union Bag and Paper, with whom he has been associated since 1938.

Jay B. Ford, Jr. who has been made assistant general manager of United States Potash, with whom he has been connected since 1947.

Sidney T. Keel, promoted to sales manager of rock phosphates by International Minerals & Chemical phosphate division.

Western Division and will work out of the Kansas City office.

* * *

E. M. Ott has been made head of a newly organized sales research department of **Pennsalt.**

* * *

Dr. Milton S. Eisenhower. Ike's younger brother, and president of Pennsylvania State, has been named chairman of the new **American-Korean** foundation.

* * *

Robert N. Conners, Vice-President and General Sales Manager of the **Chase Bag Company,** has recently been appointed to the Advisory Committee of the Executive Research Council.

The Council is composed of selected business executives and cooperates with faculty members of Northwestern University who study national and regional economic problems of importance and interest to the community.

* * *

Jim Jackson, sales representative for the **Chase Bag Company** in St. Louis, and well known amateur golfer, was picked recently as the most outstanding local athlete by a committee of Ozark A.A.U. officials. He now becomes a candidate for the annual James E. Sullivan Memorial Award.

* * *

Martin I. Cowan has announced his resignation as secretary and treasurer of **Consolidated Products Company, Inc.,** New York City, and his retirement from the firm. He had been affiliated with the firm, dealers in machinery and plant equipment, for thirty years. His son, **Robert C. Cowan,** will continue to serve as sales engineer with Consolidated.

Alfred P. Gates, has been made assistant sales manager, fertilizer division of Virginia-Carolina, according to v-p Cecil Arledge.

DEATH MAKES SWIFT CHANGES

Bowers

Sanders

The deaths of **H. E. Balbach** and of **Dr. H. B. Siems** have caused a number of personnel changes in the plant food division of **Swift & Co.**

The post of research director has gone to **M. D. Sanders,** who has been with Swift since 1925, as assistant to Dr. Siems, then as manager of the Harvey, La. Swift Laboratory and again since 1945 in Chicago as head of the chemical engineering research division laboratory. The functions of agronomist, formerly also supervised by Dr. Siems, will be performed by **A. H. Bowers,** since 1945 assistant to Dr. Siems in the plant food division.

The following changes followed the death of Mr. Balbach:

T. L. Adcock, Manager of the Plant Food Division at National Stock Yards, Illinois since 1937, is being transferred to Chicago as General Sales Manager of the Northern Divisions. **W. J. Chapin,** Manager of the Norfolk, Virginia, Plant Food Division since 1947, is being transferred to Chicago as General Sales Manager of the Southern Divisions. **A. N. D'Aubert,** Manager of the Plant Food Division at Baltimore, Md., since 1944, succeeds Mr. Adcock as Manager of the Plant Food Division at National Stock Yards. **A. W. Langdon,** Manager of the Plant Food Division at Cleveland, Ohio since 1950, becomes Manager of the Division at Baltimore. **R. A. Culbertson,** for several years Assistant Manager of the Hammond Plant Food Division, is being transferred to Cleveland, Ohio as Manager. **W. J. Richardson,** Assistant Manager for the past two years of the Georgia Plant Food Division, at Atlanta, goes to Norfolk, Virginia, as Manager. **W. F. Price,** Assistant General Manager of the Plant Food Division and General Sales Manager of the Northern Divisions, is being succeeded by Mr. Adcock as General Manager of the Northern Divisions. Mr. Price, as Assistant Manager of the Division, will have general jurisdiction over sales and advertising in addition to other administrative duties.

Mr. Cowan plans to continue his association with the chemical and allied processing industries as a consultant, advisor and appraiser.

* * *

Roy Clinton Jones of the Fulton **Bag & Cotton Mills** was awarded an honorary life membership in the Southern Seedmen's Association at

FULTON'S FAMOUS FOR:

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Whether they're plain white sheeting or colorful prints, Fulton's Cotton Bags are welcomed by farm families as valuable sewing material. They stack, store and handle easier — less waste from breakage.

FULTON QUALITY BURLAP BAGS

Burlap is here again with all its toughness and durability — and at the most attractive prices in years! As large direct importers of burlap, Fulton Burlap Bags are your assurance of uniform quality.

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Multiwalls of all types — pasted or sewn bottom, open mouth or valve, in every size, are now being manufactured in both the New Orleans and the new Los Angeles plant for speedy, coast-to-coast service.

EAGLE SAIL TWINE and MACHINE THREAD

Manufactured by Fulton also. Let us supply you with these products.

Left, Ernest C. Kontz, who has become chief sales engineer of Davidson-Kennedy Company, Atlanta, Georgia. He will coordinate sales and engineering departments. Right, C. L. Davis, who has joined D-K as a sales engineer. He has thirty years experience in the fertilizer industry.

the group's annual convention held recently in Miami Beach, Florida. An annual recognition of distinguished service in the seed industry, this year's award was the first in the history of SSA to honor an individual in a related industry. Mr. Jones began his business career at Fulton Bag in 1920.

* * *

A. L. Mehring, former senior chemist of the Bureau of Plant Industry of the United States Department of Agriculture, Beltsville, Md., has been elected chairman of the **American Chemical Society's Division of Fertilizer Chemistry** for 1953. He succeeds **Dr. Samuel F. Thornton,** director of chemical control and farm service of the **F. S. Royster Guano Company,** Norfolk, Va.

Jesse D. Romaine, secretary and chief agronomist of the **American Potash Institute,** Washington, D. C., was chosen vice-chairman and **George H. Serviss,** agronomist for the **Cooperative G.L.F. Exchange, Inc.,** Ithaca, N. Y., was named secretary-treasurer.

* * *

B. J. Fitzgerald, of the **Julius Hyman & Co.** Division, **Shell Chemical Corporation,** has been transferred from Denver, Colorado, to Atlanta, Georgia, as field representative for the Product and Sales Development Department, it was announced by **F. W. Hatch,** Division Manager. At his new location, Fitzgerald will be concerned with experimental and development work in the Southeastern states on the company's soil fumigants, D-D and CBP-55.

* * *

Hubert J. McCormick has been made sales manager of the Caldwell plant of **Link-Belt Company,** Chicago, succeeding **Erwin A. Wendell,** currently on leave.

Left, E. H. Howell, who retired January 1 as manager of the St. Louis plant of Bemis Bro. Bag Co. He has been succeeded by P. C. McGrath, right, who was assistant manager. Mr. Howell began with Bemis in 1908. Mr. McGrath joined them in 1913. A. J. Grunzinger, formerly assistant salesmanager moves up into Mr. McGrath's position.

New Firm To Serve Fertilizer Industry

Announcement is made in this issue of Commercial Fertilizer of formation of a new firm, Fertilizer Equipment Sales Corp., which will have sales and engineering offices at 130 Krog St., N. E., Atlanta, Ga., and manufacturing plant at 1610 Kentucky St., New Orleans, La. The new company will function as designers, engineers and manufacturers of fertilizer machinery to serve the fertilizer industry.

O. H. Sale, who is president of the newly formed firm, will direct sales and engineering. Mr. Sale is well known in the fertilizer industry and possesses a wide background in both the oil mill and fertilizer industry. Redding Sims, secy-treas. of the new firm, is also president of National Blow Pipe and Mfg. Co., of New Orleans, La., and has had many years of manufacturing experience being particularly well known in the oil mill industry. Mr Sims will be in charge of manufacturing.

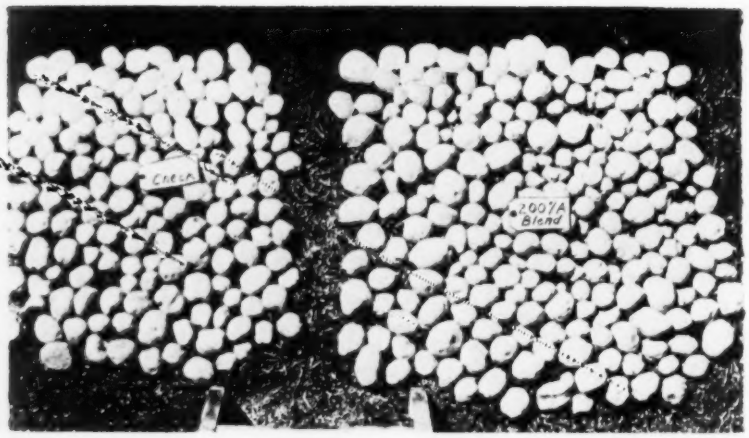
Allen S. Jackson and Marvin Wheeler will be associated with Fertilizer Equipment Sales Corp., as sales engineers. Both Mr. Jackson and Mr. Wheeler have been identified with the fertilizer industry having worked previously for several years in association with Mr. Sale.

Fertilizer Equipment Sales Corp., will offer "Fesco's" own custom service in working with fertilizer manufacturers for more effective plant operation.

Paper On Granulated Nitrophosphate Fertilizers

A nine-page paper, prepared by the Company of St-Gobain, France, describing granulated nitrophosphate fertilizer processes, with details and advantages of the process, is available through General Industrial Development Corporation, 270 Park Avenue, New York 17.

FERRO ANNOUNCES NEW PLANT FOOD, CALLED "FTE"



Yield of equal rows of a potato experiment are shown in this photo. The row treated with equivalent of 200 pounds per acre of Ferro's FTE increased yield approximately 40 per cent over that from the untreated row.

The Ferro Corporation of Cleveland culminated a five-year program of research and experimentation with the announcement by C. D. Clawson, Ferro president, that it has developed a new substance to provide plants and crops with trace elements necessary to full growth and to restore vital minerals to deficient soil.

He also revealed that the new product will be marketed to home gardeners, farm crop growers and fertilizer dealers early in 1953 by Ferro and the Dupont Company, of Wilmington, Delaware.

The new product is called FTE, which is an abbreviation for "fitted trace elements". It contains minute quantities of minerals essential to full plant development. These minerals are manganese, iron, zinc, copper, boron and molybdenum, which are widely recommended as supplements to the nitrogen, phosphorus and potassium contained in standard commercial fertilizers.

Mr. Clawson said FTE is the first practical form of trace elements to provide a slowly soluble source of minerals necassary to full plant growth. He listed the advantages of FTE over conventional trace elements applications as follows:

1. FTE will not wash out of the soil.

2. FTE will not combine with other elements to become unavailable to plants. It remains constantly available.

3. FTE, being slowly soluble, wil remain in the soil over an extended period of time and at least a full season. This makes it unnecessary for repeated applications which are frequently mandatory in the case of soluble salts.

4. FTE's relative insolubility prevents toxic amounts of trace elements from injuring plant roots and provides a slow but constant source of trace elements needed for good growth. Over-concentrated applications cannot harm plants as in the case of soluble salts.

In the course of the five-year research program instituted by Ferro, in addition to Ferro's own program of research, the company authorized a broad grant-in-aid program to further research at state universities and state experiment stations. One of the most important projects was conducted at Michigan State College under the direction of Dr. F. L. Wynd, who conducted research projects over the entire five-year period.

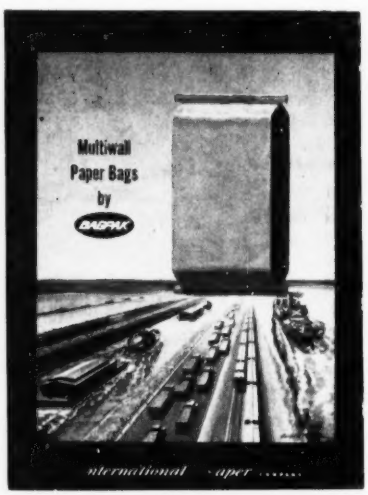
Other grant-in-aid programs were conducted at the University of Georgia, under Dr. Francis E. Johnstone, Jr., and Roy A. Bowden; at the New Jersey Agricultural Experiment Station, under Dr. Norman F. Childers; and elsewhere.

FTE will be sold by Ferro directly to major element fertilizer manufacturers. Small package marketing of the product to home gardeners and small growers will be handled by the Dupont Company.

Dieldrin Approved In California

The well known agricultural insecticide, dieldrin, has been approved for control of Argentine ant on citrus in the state of California. In making the announcement, F. W. Hatch, Manager, Julius Hyman and Company Division of Shell Chemical Corporation, added that federal acceptance of dieldrin for this use was anticipated in the near future.

Here is the cover of a brochure you should have in your files to give you all the information you need to specify the correct multiwall bag for almost any purpose. It was developed by Bagpak Division, International Paper Company, 22 East 42nd Street, New York 17, N. Y. Ask for Brochure No. B9.



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advantages

The St. Gobain process manufactures complete Nitrophosphate granulated fertilizers in one continuous automatic operation. Its extreme flexibility permits the production of various nitrogen-phosphorous-potash formulae without altering the equipment.

benefits

You benefit from the improvements made during the ten years of successful industrial operation. The St. Gobain system reduces the sulphuric acid consumption by replacing it with nitric acid. No phosphate rock grinding is necessary.

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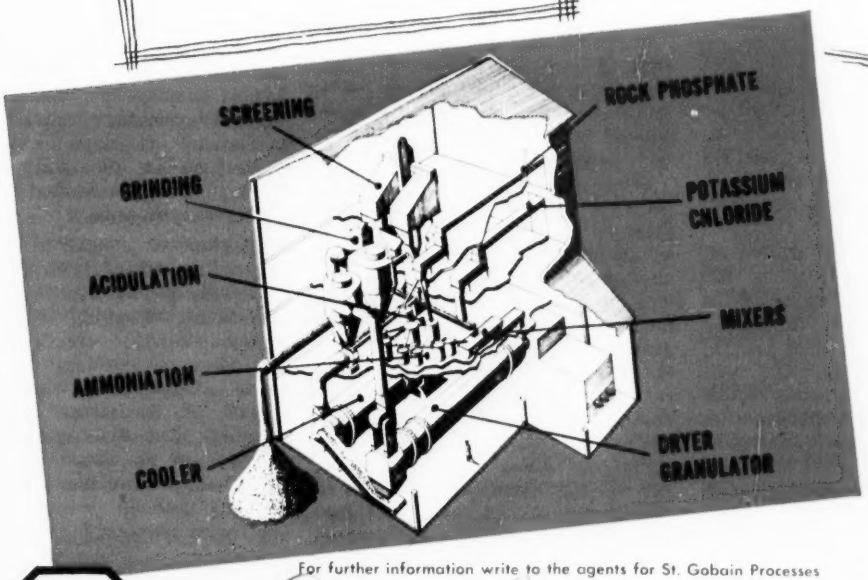

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270 PARK AVENUE, NEW YORK 17, N. Y.

EXAMPLES OF FORMULAE PRODUCED BY ST. GOBAIN PROCESS

N %	P.O. %	K.O %	
10	10	17	(sulfo-nitric acidulation)
11	11	11	" " "
10	15	20	(phospho-nitric acidulation)
12	15	18	" " "
12	12	20	" " "
14	14	14	" " "
10	20	20	" " "

In the field of farm

PESTICIDES

TWO COTTON PEST CONFERENCES

Two cotton conferences were held in Memphis last month, both revolving around cotton pest problems, and attracted a total of some thousand earnest men who are genuinely disturbed about the problems of the cotton belt. The first of these meetings was held December 4-5 in Memphis, and covered the subject of weed control.

Summing up the spirit of the meeting is the attitude of R. H. Sloan, Arkansas AES cotton specialist who recited chronicles of both success and failure during the 1952 season with herbicides to control weeds and grass. "Hard luck", Mr. Sloan believes, "may have been a blessing in disguise because the farmers will profit by their mistakes and do a better job next season."

The feature of the December 10-11 meeting, devoted to insect control, was an unscheduled appeal by a cotton farmer in the quarantined belt, who spoke of the urgent problem of the pink bollworm, and the great need for better and more positive methods to stop the relentless march of this pest.

Speakers at the weed conference, the first day, in addition to Mr. Sloane, were Dr. W. C. Shaw, USDA weed division agronomist who asked for more data from the field, and Dr. D. A. Hinkle, Arkansas AES who promised further work in the region, testing weed killing materials in both pre- and post-emergence techniques.

The Thursday afternoon program was filled with reports from a panel conducted by Dr. E. D. Whitman, Columbia Southern Chemical, and composed of Dr. W. B. Albert, physiologist, South Carolina AES; Dr. W. B. Ennis, heading up plant physiology and pathology at Mississippi AES; Dr. W. A. Harvey, weed specialist, California AES. A group of engineers, led by M. R. Powers, formerly with Edisto AES in South Carolina spoke of the need to tailor land and seed bed preparation to suit the use of herbicides.

Other experts, detailing steps in applying herbicides, stressed that both pre- and post-emergence applications are precision operations, requiring properly adjusted equipment and a thorough knowledge of techniques.

E. R. Stamper, pathologist, Louisiana Agricultural Experiment Station, led the panel discussing pre-emergence application, while the post-emergence application group was led by John Holstun, agronomist, Delta Branch Experiment Station, Stoneville, Miss.

O. B. Wooten, agricultural engineer, Delta Branch Experiment Station, headed a discussion on cultivation, flaming and late season weed control practices, and their relation to herbicidal control.

Other specialists, led by Rex F. Colwick, State College, Miss., coordinator, Cotton Mechanization Project, pointed out that calibration of application equipment is one of the most precise and complex requirements in controlling weeds and grasses in cotton with herbicides. Some presented charts, tables, slide rules and other computing devices designed to simplify the calibration job for the cotton farmer.

Planting dates, seeding diseases, and climatic conditions all have a relationship to herbicidal weed control—one which cannot be stressed too much—John T. Presley, pathologist, Division of Cotton and Other Fiber Crops and Diseases, USDA, Beltsville, Maryland, emphasized.

Suggested educational programs for cotton farmers to guide them in weed control practices were outlined in another panel led by O. N. Andrews, cotton specialist, Alabama Agricultural Extension Service.

At the end of the meeting Dr. R. L. Lovvorn, general conference chairman, presented a summary of suggestions for use of herbicides in cotton in 1953. These were prepared by the conference steering committee. Dr. Lovvorn, Beltsville, Maryland, is head of the Division of Weed Investigations, USDA.

Other presiding officers were Randall J. Jones, associate director, Oklahoma Agricultural Experiment Station; Dr. S. J. P. Chilton, head of the department of botany and plant pathology, Louisiana State University; and Dr. W. B. Ennis.

The insect control contest, similarly, featured leading men in the field. A. S. Hoyt, chief of the Bureau of Entomology and Plant Quarantine called for more research.

K. P. Ewing, Waco, Texas, entomologist, Bureau of Entomology and Plant Quarantine, in charge of pink bollworm research, said in the past year the research staff has been doubled.

Discussing pink bollworm control programs were A. N. White, extension entomologist, Texas Agricultural Extension Service, Weslaco; C. B. Spencer, agricultural director, Texas Cottonseed Crushers Association, Dallas; and R. W. White, project leader, pink bollworm control, BEPQ, San Antonio.

Speakers on a panel at the closing session Thursday afternoon — Observations and Experiences with Insecticides, Spraying, and Dusting Equipment 1952 — emphasized that: (1) frequent checking of cotton fields is essential in cotton insect control; (2) timeliness, interval of poisoning, and thoroughness of application all are more important to cotton pest control than the type insecticide used.

E. E. Ivy, entomologist, BEPQ, College Station, Texas, describing research on systematic insecticides said one compound looks promising for boll weevil and further tests are being conducted along this line, but little success has been achieved in

development of a systematic insecticide for pink bollworm.

L. S. Hitchner, executive secretary, National Agricultural Chemicals Association, Washington, urged early buying of pesticides by farmers.

Dr. F. C. Bishopp, assistant chief, Bureau of Entomology and Plant Quarantine, Washington, set the tone for discussions which occupied most of the opening day of the conference, when he declared that further legislation to regulate sale of insecticides, as a public health measure, is not necessary.

Both Dr. W. J. Hayes, Jr., chief, Toxicology Section, U. S. Public Health Service, Savannah, Ga., and Dr. G. C. Decker, head, Section Economic Entomology, Illinois State Natural History Survey, Urbana, pointed out that no cases of poisoning, due to residues of organic insecticides in foods, have been discovered.

A panel led by Dr. Decker, however, did warn of careless handling of pesticides by farmers. Nearly all complaints of poisoning by insecticides, they agreed, could be traced back to carelessness of applicators.

Taking part in this panel were C. F. Bower, entomologist, State Board of Agriculture, Oklahoma City; Robert T. Gast, department of entomology, North Carolina State College; D. Gray Miley, manager, the Panther Burns Company, Leland, Miss.; L. A. Garruth, head, Department of Entomology, University of Arizona; and Harvey Bales, director, National Insecticide Association, Glendale, Arizona.

Other Wednesday afternoon speakers and their topics:

Cotton Defoliation — A Promising Aid for Insect Control"—E. W. Dunnam, entomologist, BEPQ, Stoneville, Miss. Collaborating in the report were A. J. Chapman, BEPQ, Brownsville, Texas, and Dr. H. R. Carns, Bureau of Plant Industry, Soils and Agricultural Engineering, Stoneville, Miss.

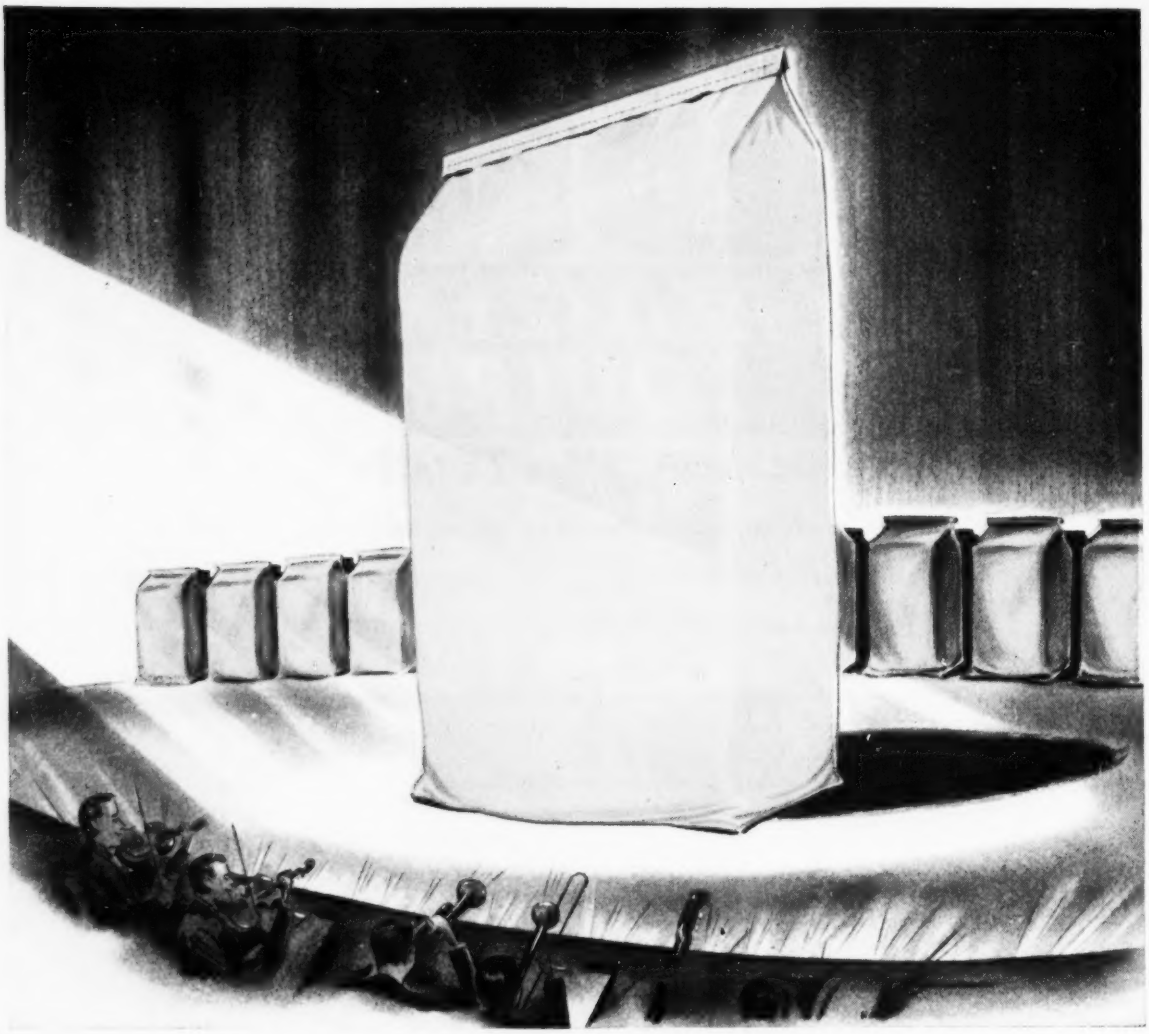
"Research Highlights of 1952,"—Dr. M. D. Farrar, head, department of entomology, Clemson Agricultural College, Clemson, S. C.

"Promising New Developments in Insecticides,"—Dr. J. C. Gaines, head department of entomology, Texas A&M College.

Speakers at the opening session Wednesday included General Conference Chairman Robert R. Coker, president, Coker Pedigreed Seed Company, Hartsville, S. C.; Claude L. Welch, director, production and marketing division, National Cotton Council, Memphis; C. G. Gibson, director, Texas Agricultural Extension Service; and Dr. R. F. Poole, president, Clemson Agricultural College, Clemson, S. C.

Appointment of five major committees to lay plans for the cotton industry's 1953 research and promotion program was announced by Harold A. Young, president of the National Cotton Council.

The committees are scheduled to meet in Dallas, Texas, January 24 to develop recommendations for action by the Council's delegate-membership at their annual meeting January 26-27.



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MARKETS

Organics: Rather little activity is noted in the fertilizer organic market. Domestic producers of Nitrogenous Tankage are in heavily sold positions but limited supplies of Nitrogenous Tankage are available at prices ranging from $4.55 to $5.00 per unit of Ammonia, bulk f.o.b. shipping point. Imported Nitrogenous is indicated at around $6.15 to $6.00 per unit of Ammonia, bagged, CIF Atlantic port.

Castor Pomace: Domestic production continues at $37.25 per ton in burlap bags/paper bags, f.o.b. Northeastern production points with $2.00 per ton allowance for shipment in paper bags. Available supplies not already contracted are very limited. Imported material ranges from $36.50 to $43.00 per ton CIF Atlantic ports, depending on the quality.

Dried Blood: Dried unground blood, in bulk, is indicated at around $7.25 per unit of Ammonia f.o.b. Chicago area with New York market at around $7.75 per unit.

Potash: The OPS has recently permitted a flat price of 43¢ per unit K.O, in bulk, carload lots, f.o.b. Carlsbad, New Mexico which now puts all Carlsbad producers on the same price basis. Imported Muriate and Sulphate continues to arrive in limited quantity, relative to last year's imports. Prices are slightly under the cost of domestic material at port destinations.

Ground Cotton Bur Ash: This form of Potash, primarily in the form of carbonate of Potash, continues available for prompt and future shipment at prices approximating the delivered cost of domestic Sulphate of Potash. Current production tests 38% to 42% K.O.

Phosphate Rock: The market continues firm with the high grade Florida rock in shorter supply than the low grade. Supplies continue adequate.

Superphosphate: Production continues at a good level and it is expected that movement will increase heavily after the turn of the year. Triple Superphosphate continues short of demand with the current price 91¢ per unit APA bulk, f.o.b. Tampa.

Sulphate of Ammonia: Effective December 1st, practically all producers of coke-oven material advanced their prices 10% making the new level $44.00 f.o.b. Pittsburgh district and $49.50 f.o.b. Birmingham area. Synthetic material at Atlantic ports from one domestic producer will advance, effective January 1st, $4.00 per ton. Imported synthetic material is currently available at Atlantic and Gulf ports at around $52.00 to $50.00 f.o.b. cars at ports.

Ammonium Nitrate: Production continues high but inadequate to meet the demand. Current prices are $72.50 per ton f.o.b. Port Robinson, Ontario, $64.00 f.o.b. El Dorado, Arkansas and Military, Kansas and $64.80 per ton f.o.b. Etter, Texas for bagged material.

Nitrate of Soda: Stocks are being increased to meet expected spring demand. No change in prices - - $57.00 per ton f.o.b. cars at port in bags - - has been announced.

Imported Calcium Ammonium Nitrate: This form of Ammonium Nitrate of which approximately 40% is Lime and testing 20/21% Nitrogen is available for fall and spring shipment at $51.25 per ton in 100 lb. paper bags f.o.b. cars at several Atlantic and Gulf ports.

General: Domestic prices of Sulphate of Ammonia, generally, have advanced 10%. Nitrogen solutions, by one producer, has advanced $3.00 per ton. Imported Sulphate of Ammonia prices have been reduced from recent levels. Superphosphate is currently in comfortable supply as also is Potash.

FERTILIZER TAX TAG SALES AND REPORTED SHIPMENTS
(In Thousands of Equivalent Short Tons)
Compiled by The National Fertilizer Association

OCTOBER

STATE	October 1952	October 1951	September 1952	September 1951	Jan.-Sep. 1952	Jan.-Sep. 1951	Jul.-Aug.-Sep. 1952	Jul.-Aug.-Sep. 1951	July-September 1952-53	July-September 1951-52
Virginia	–	–	–	–	743	692	90	91	90	91
N. Carolina	–	–	53	56	1,675	1,541	91	94	91	94
S. Carolina	48	67	50	41	827	750	84	71	84	71
Georgia	67	66	29	32	1,171	1,071	69	53	69	53
Florida	105	134	97	62	867	807	201	152	201	152
Alabama	–	–	51	29	1,005	945	131	82	131	82
Tennessee	34	90	36	32	517	465	67	73	67	73
Arkansas	16	15	9	6	329	373	35	22	35	22
Louisiana	24	19	18	11	279	264	38	29	38	29
Texas	53	65	54	51	473	425	95	79	95	79
Oklahoma	–	–	32	23	167	126	57	38	57	38
TOTAL SOUTH	347	456	429	343	8,053	7,459	958	784	958	784
Indiana	30	39	82	36	803	648	250	197	250	197
Missouri	37	31	88	77	725	614	251	167	251	167
TOTAL MIDWEST	67	70	170	113	1,528	1,262	501	364	501	364
California	–	–	–	–	–	–	–	–	–	–
TOTAL OTHER	–	–	–	–	–	–	–	–	–	–
GRAND TOTAL	414	526	599	456	9,581	8,721	1,429	1,148	1,459	1,148

NOVEMBER

	November 1952	November 1951	October 1952	October 1951	Jan-Oct 1952	Jan-Oct 1951	July-Aug-Sep 1952	July-Aug-Sep 1951	July-October 1952-53	July-October 1951-52
Virginia	–	–	–	–	–	–	90	91	–	–
N. Carolina	–	–	89	91	1,763	1,632	91	94	179	185
S. Carolina	42	65	48	67	874	817	84	71	131	137
Georgia	80	59	67	66	1,238	1,137	69	53	136	119
Florida	153	167	105	134	971	941	201	152	305	287
Alabama	–	–	45	45	1,050	991	131	82	176	128
Tennessee	32	36	34	90	551	555	67	73	101	163
Arkansas	11	13	16	15	345	388	35	22	51	37
Louisiana	19	12	24	19	303	283	38	29	62	48
Texas	29	43	53	65	526	490	95	79	148	144
Oklahoma	–	–	10	14	176	140	57	38	66	52
TOTAL SOUTH	366	395	491	606	7,797	7,374	958	784	1,355	1,300
Indiana	116	179	31	39	834	687	250	197	281	235
Missouri	17	34	37	31	762	646	251	167	289	199
TOTAL MIDWEST	133	213	68	70	1,596	1,333	501	364	570	434
California	–	–	–	–	–	–	150	137	–	–
TOTAL OTHER	–	–	–	–	–	–	150	137	–	–
GRAND TOTAL	499	608	559	676	9,393	8,707	1,609	1,285	1,925	1,734

NITROGEN DIVISION EXPANDS UREA PRODUCTION AT SOUTH POINT

Nitrogen Division, Allied Chemical & Dye Corporation, has announced plans for urea products expansion at its South Point, Ohio, plant. Project, involving expenditure of more than $4,000,000 dollars, includes doubling of plant's urea synthesis capacity, together with installation of facilities to produce a pebbled urea fertilizer compound and an improved urea cattle feed compound. It is expected construction will be started shortly after the first of the year and that the work will be completed in early 1954.

Doubling of urea synthesis capacity will be effected through modification of present South Point plant to a new process. The new process developed by Nitrogen Division is said to be more efficient and capable of producing urea of exceptionally high purity required when used as cattle feed supplement and as raw material for manufacture of plastics and other chemical products.

The new production of urea will be made available as a pebbled, kaolin-coated fertilizer compound containing 44% plant food nitrogen. Product will be free flowing with good storage properties, easily handled in fertilizer distributing equipment and ideally suited for direct application to growing crops. Since urea is the most concentrated solid nitrogen fertilizer material, its consumption results in reduced requirements for transportation equipment and lower application costs to the farmer per unit of plant food. In view of these advantages of urea, Nitrogen Division officials anticipate that the new pebbled urea fertilizer material will be of large benefit to the farmers of Ohio and adjacent states in terms of more crops and greater prosperity.

End-product plant will also be constructed to produce an improved urea-feed compound with guaranteed 42% nitrogen content. One hundred pounds of this material, when fed to cattle in conjunction with non-protein materials, will provide food values equivalent to 262 pounds of protein.

Nitrogen Division officials pointed out that the urea expansion program for South Point, Ohio, will represent an important step in Division's forward program by making available to American farmers additional supplies of high concentration nitrogen products and fertilizers of the type and form advocated by leading State and Federal agronomists. Other steps in this program were indicated to include increases in ammonia capacity now nearing completion at Hopewell, Virginia, and South Point, Ohio; and new plants now under construction for production of ammonia and urea near Omaha, Nebraska, and nitraphosphate high analysis fertilizer at South Point, Ohio.

Research and pilot plant work on urea synthesis and end-products to be used by Nitrogen Division was done by Division's Development Department at Hopewell, Virginia, working in cooperation with South Point production personnel. In urea synthesis process, by-product carbon dioxide recovered from ammonia synthesis gas will be purified, compressed, mixed with anhydrous ammonia, and passed through a series of autoclaves to form urea. Since urea synthesis presents a serious problem of possible equipment failure and corrosion, a considerable portion of Nitrogen Division's research effort on the project has been directed to development of suitable construction materials and substitutes for alloys vitally needed for other defense uses.

MEETINGS OF INDUSTRY INTEREST

Mississippi. James A. Naftel, agronomist for Pacific Coast Borax southern division was the featured speaker opening the fourth annual short course of the State College December 4. Other speakers included Dr. Russell Coleman, NFA president.

* * *

Texas. Holding its second annual convention in Dallas, the 3-year-old Agricultural Ammonia Institute elected J. I. Davis, Liquid Fertilizer Company, Albany, Georgia, its president; Mark C. Craft, Midwestern Fertilizer Company, Springfield, Illinois, first vice-president; Hampton Pugh, Pugh Gin and Fertilizer Company, Tiller, Arkansas, second vice-president; W. D. Tucker, John Blue Company, Huntsville, Alabama, Secretary; Maj. Gen. Ralph H. Wooten, Mid-South Chemical Company, Memphis, Tennessee, treasurer.

Dr. W. D. Andres, Mississippi State College, who pioneered the use of anhydrous ammonia, predicted great gains in its use in the years ahead.

* * *

Alabama. The fourth annual Southern Regional Phosphorus Work Conference, held December 16 at Auburn, brought delegates from nine Southern states, Puerto Rico and from Washington, D. C. Use of radioactive phosphorus, and plans for future studies were the major subjects of the meeting.

* * *

Wisconsin. The Milwaukee Chapter of the Soil Conservation Society of America held in Racine late last month named A. B. Foster as chairman to succeed Richard Reinke.

* * *

Missouri. Fertilizer dealers from all over Southwest Missouri were scheduled to meet at dinner at the Drake Hotel, Carthage, January 8. Arnold Kelmme, University of Missouri was to speak.

(Continued on page 76)

FOR DEPENDABLE HEAVY-DUTY SHIPPING SACKS...

there is no substitute for kraft!

Kraft, manufactured from wood fibers, is the strongest paper known to industry. It was introduced in this country in 1909, just about the time when the first generation of Gilmans started manufacturing bags.

As pioneers, we have spanned the years with practical knowledge, technical skills, packaging experience . . . and our modern, completely integrated facilities are a notable example of kraft paper production and conversion.

Now in our 3rd generation of specialization, we are expert in pulp and paper making, in bag manufacturing, in bag printing, in bag designing.

Dependable as a Source . . .
Dependable as a Service

KRAFT BAG CORPORATION

GILMAN PAPER COMPANY SUBSIDIARY
630 Fifth Avenue, New York 20, N. Y.
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Plants at Gilman, Vt. & St. Marys, Ga.

MADE-TO-ORDER MULTIWALL SHIPPING SACKS
2 TO 6 PLY—PRINTED OR PLAIN

- Sewn Valve
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Gilman PAPER CO.
• St. Marys Kraft Corp.
• Command Tape Div.
• The Celluseal Corp.
• Kraft Bag Corp.

If your product fits into a bag—we'll make the bag to fit your product

Japan

(Continued from page 34)

ference in 1953, to which invitations will be sent to all of the Southeast Asian nations, Japan's best customers.

In promoting exports, Japan will rely largely on its five major chemical fertilizer companies to supply the products it hopes to sell. The largest of these is the Showa Electric Industry Company, which has its own electric power plants capable of generating 300,000,000 kilowatt hours of electricity a year. This company has an annual production capacity of 334,000 tons of ammonium sulphate a year and 220,000 tons of calcium cyanamide. The Nitto Chemical Company can produce annually 210,000 tons of ammonium sulphate, 132,000 tons of superphosphate, and 84,000 tons of synthetic fertilizer. The Tokyo High-Pressure Industry Company, once an affiliate of the far-flung Mitsui empire, can produce annually 390,000 tons of ammonium sulphate and 54,000 tons of urea. This company has reportedly improved its gas process for making ammonium sulphate. The Nissan Chemical Industry Company is the oldest full-fledged chemical fertilizer company in Japan. It has annual capacity for producing 110,000 tons of ammonium sulphate though the electrolytic process and 70,000 tons under the gas progess. The Electric Chemical Industry Company, also a Mitsui affiliate at one time, has an annual capacity for 150,000 tons of calcium cyanamide a year.

On the whole, Japan has a modern chemical fertilizer industry which is managed on a big scale. Domestically there is a good demand for Japan's chemical fertilizer, but Japan's arable land is severely limited, about 16 per cent of the entire nation. For expansion of the chemical fertilizer industry, therefore, Japan must find export markets for her products. There is no doubt that all Asian countries need chemical fertilizers, but there is some doubt that the political stabilization and funds to buy Japan's chemical fertilizers might be long in coming.

Safety

(Continued from page 40)

on masonry or masonry-protected floors, and it is advisable to contemplate a three foot clearance around the stoves, maintained by metal screens if necessary. Where metal stove-pipes must pierce combustible walls or roofs, the clearance to wood, including wood members of wood skeleton metal clad walls, should be maintained by metal collars or braces affording a minimum of six inches clearance all around ordinary smallsized stovepipes. This calls for a circle 18 inches in diamter around a well centered 6-inch stovepipe. For gas units requiring vents, there are Underwriters' approved flues generally needing but one-inch clearance for other than large Btu capacity heaters.

Electrical installations should have regular maintenance inspections to insure continuity of operations, safety to life and absence of fire hazards. Motor and equipment frames and metal protected wiring systems should have the required ground connections. Open wiring should be maintained firmly supported at the proper distances on standard insulator supports, and sections torn loose or otherwise abused should be replaced. Fuses require occasional checking, as it is common to find the original 15 ampere safety devices on No. 14 wire branch circuits replaced by 30 ampere fuses, thus removing the safety factor. Watch for pendant lamps in contact with combustible materials such as bags and boxes. In some cases a double globe would be advisable even though the location is free from dust, dampness or vapor hazards.

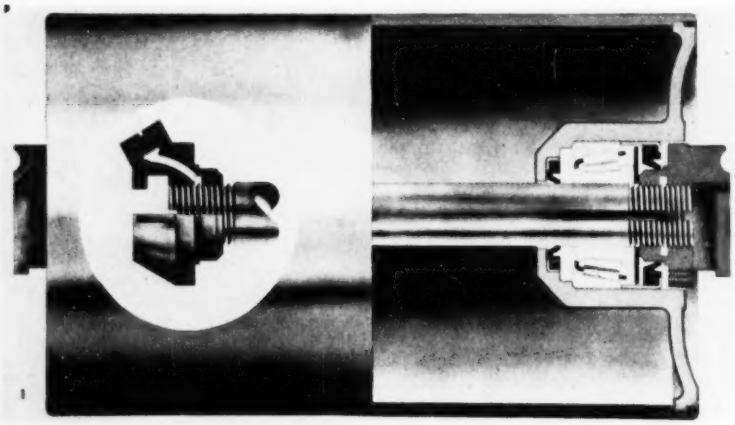
Electrical equipment subject to corrosion should be kept well painted with corrosion resistant paint, and motor frames, windings, starting devices and bearings should be cleaned of dust as often as is necessary, to insure long and safe operation. Any open equipment in dusty locations may be noted for replacement by dust tight devices in long range improvement planning.

If several changes have been made in an original electrical installation, it may be well to have the load checked at various points, and when such is done, the resistance to ground should also be tested.

A word of caution appears in order for temporary installations. "Temporary" is an unreasonably long time, very frequently, but regardless of the length of time a substitute motor or circuit is intended to be used, it should be installed in a substantial manner with proper fusing and grounding.

Smoking should be permitted only in safe areas, not where combustible

This is a new type sealed and prelubricated Timken Bearing belt conveyor idler, offered by Industrial Division, Continental Gin Company, Birmingham 2, Alabama. It is designed for extended operation without relubrication. Write them for details on Type "UST."



stock or supplies or materials in combustible containers are stored or where localized specific hazards exist. Areas designated as permissable for smoking should be provided with metal receptacles for discarded smoking materials, and a campaign for safe smoking habits may be productive.

Cutting and welding torch use is accounting for an increasing number of fires despite widespread publicity for safe use. Be certain the users are qualified to the extent of knowing the hazards and safeguards for any combustible or explosive materials being worked on, or nearby, when portable cutting or welding equipment is being used outside of the welding shop. Do not permit the torch to replace the hack saw completely.

The carpenter shop, blacksmith and machine shops, paint shop or storage building, garage and print shop, and perhaps other auxiliary maintenance or process sections, all present the usual hazards common to such occupancies and require inspection vigilance.

Gasoline tractors and dumpsters, if used, should always be filled outside, and water type mufflers, where used, should be properly maintained to prevent these machines from introducing additional hazards.

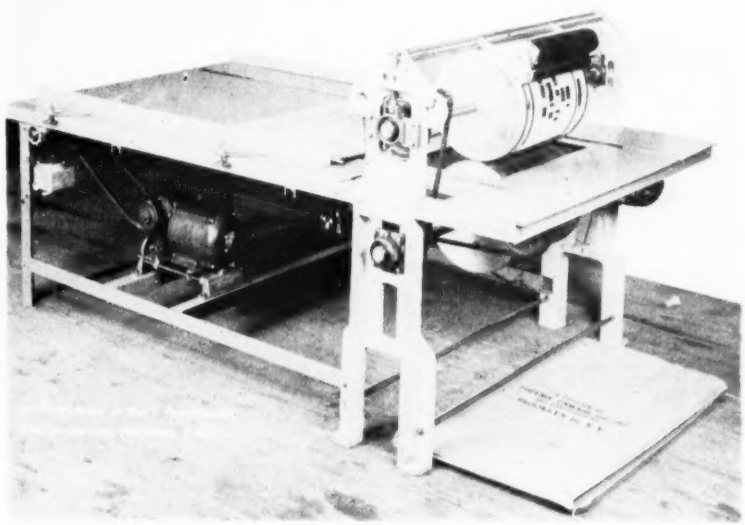
As in the case of any other type of equipment, fire protection devices need reasonable care. The best equipment can be rendered useless by poor maintenance. Since fire equipment is strictly for emergency use, it should be maintained in constant readiness. Inspection, testing and training in use are essential to proper performance when emergency arises. Thorough inspections should be made, preferable weekly and not less than monthly. Where equipment is extensive, such as at location with sprinkler and outside yard hydrant systems, a self-inspection form should be completed and filed through definite supervisory channels. Forms are frequently designed to fit the individual risk or plant, but various sources offer general fire protection inspection blanks. In some cases, such reports are a requirement of underwriters on a weekly, bi-weekly or monthly basis. These inspections should be made at stated times regardless of any inspection by the interested underwriters. In addition, it is well to plan to have alternate inspections by various fire brigade members, although the normal procedure is to choose inspectors with some mechanical knowledge.

Most frequent inspection with testing is accorded automatic sprinkler and private water supply systems. It is most important that all normally open control valves be checked to see that they are open and accessible, and they should be operated their full gate travel distances occasionally to make certain of their operative condition. Where sprinklers subject to freezing are served by dry pipe valves, air pressure must be checked regularly, at least weekly, at which time the alarms should also be tested. Wet pipe sprinkler alarm valves should also be tested at short intervals, except that it is best not to run water through hydraulic operated alarms during freezing weather. Make sure that no sprinklers are missing or disconnected, or obstructed by stock or structural alterations. Note for remedial attention any heads loaded with dust or other deposits, or any corrosion of heads or pipe such as is likely to be caused by ammonia fumes or acid mist. Provide guards for heads subject to mechanical injury.

Fire pumps should be brought up to speed and pressure weekly, at which time, make certain that any priming tanks are full. Gravity tanks and reservoirs are to be kept full, and in cold weather, the functioning of the heating systems should be checked. It would be advisable to check the latter well before the advent of cold weather. Flushing and cleaning should be performed as required.

Hydrants should be checked in spring and fall by opening the valves and flushing, and then making certain that the barrels drain when the valves are shut. Lubricate hose thread caps, if necessary. Check the condition of hose and try to use all cotton rubber-lined hose in rotation semi-annually, at prac-

This is the #7 Auto-Printer made by The Industrial Marking Equipment Company, 7 East 48th Street, New York 17, for the imprinting of multiwall bags, and can be made part of a production line. Matter to be printed can be changed quickly, and no make-ready is necessary. A quick-dry ink is used, and type and ink rollers need to be cleaned after using. Guaranteed against all defects for one year. Write for illustrated folder, and full information.



tice sessions, thoroughly drying and reracking the hose after use. Linen hose should not be used except at a fire, or for testing if its condition appears doubtful. Before reinstalling, it must be dried carefully, as dampness rots this type of hose. See that auxiliary equipment is in the hose houses and replace or repair any damaged equipment.

Standpipe valves should be checked to make certain water is not leaking into the attached hose—and the hose should be kept attached.

Extinguishers should be in their proper places and readily accessible. Occasionally, after recharging a careless interchange of extinguisher types may be made, which seriously impairs protection in two or more areas and perhaps creates a life hazard as well. Such would be the case if a conductive stream extinguisher were used in haste on an electrical hazard, or should an attempt be made to use a gas type extinguisher on a serious Class A fire.

General condition of extinguishers including hose and nozzles should be ascertained at each inspection. A complete examination, including discharge, cleaning and refilling of soda-acid and foam types should be an annual practice. At such times also, carbon dioxide type extinguishers and the gas cartridges in the various gas-operated extinguishers should be weighed to check the charges of gas, and the solution or powder should be examined to check its amount and condition. Pump type extinguishers require a few strokes of the pump.

Of course, the fire brigade (including watchmen) should maintain its efficiency by practicing with the various protective devices provided. It is also advisable to have all employees familiar with the "first aid" or hand type fire extinguishers. The office help should be so trained, as well as plant force. The annual recharging period presents a good opportunity to demonstrate the correct uses of the various types of extinguishers. Permit other personnel to use the extinguishers located at or near their respective work stations. Much of the value of the annual recharging procedure is lost if extinguishers are merely "dumped" and recharged, or if recharging is done elsewhere than on the premises.

When in doubt as to the use of an extinguisher, and certainly before its use is needed, do not forget that brief instructions for use as well as for recharging appear on the label of every hand-operated extinguisher Those instructions should be a required one minute of reading for everyone in the vicinity of an extinguisher.

Summarizing, maintenance factors in fire protection require that specific or favorable design features affording fire control through limitation of damage, such as space and fire walls, be maintained during plant alterations and expansion; that no occupancy be established in a structure unsuitable for that occupancy or creating an exposure to important property; that special safeguards be provided for changed operations which introduce an element of hazard.

Elimination of fire causes requires common sense and vigilance.

Most common hazards present loss possibilities in practically every type of plant, and each specific industry has a few hazards peculiar to the industry. Those found in fertilizer manufacturing operations are neither unusually numerous nor insurmountable, yet their study and removal will present a great opportunity for bettering the fire safety record of the industry.

Fire equipment is available which is suitable for the conditions found in the industry. Proper maintenance requires no more than scheduled weekly to monthly inspections, and semi-annual to annual usage. Such use of the major equipment affords fire brigade training; the testing of the smaller devices offers an opportunity to both instruct and interest the entire personnel group.

* * *

ADDENDA:

These discussions on the design and maintenance of fire protection for the average fertilizer plant are of broad scope in order to illustrate the most important aspects of the problem facing this particular group. Each phase of the problem warrants additional study, most of which can be done using material from readily available sources. It is suggested that during subsequent meetings, certain portions of the problem be isolated for more detailed discussions.

In the meantime, as questions arise concerning the problems outlined, do not hesitate in seeking the assistance of qualified consultants, your state inspection or rating of bureaus, or the representatives of the interested underwriters.

Also of assistance will be such publications as:

—"Employee Organization for Fire Safety", by the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts.

—Various pamphlets on specific protection standards or suggested structural and occupancy safeguards, by the National Board of Fire Underwriters, 80 John Street, New York, New York.

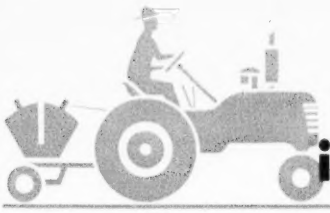
—"Organizing your Plant for Fire Safety" at $2.00 by the Associated Factory Mutual Insurance Companies, 184 High Street, Boston 10, Massachusetts.

—"Fertilizer Grade Ammonium Nitrate", Manual Sheet A-10 at fifty cents, by the Manufacturing Chemists Association, Inc. at 246 Woodward Building, Washington 6, D. C. is also recommended reading on handling, storage and use of this product.

Some of the equipment manufacturers also have material affording splendid assistance such as:

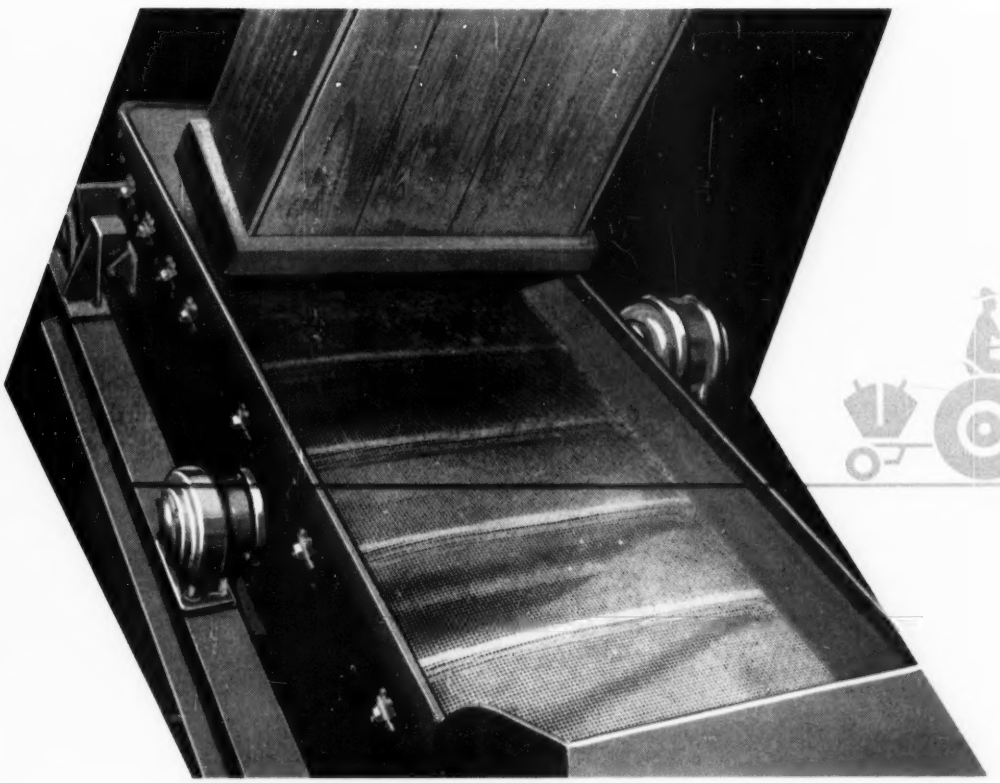
—"Training Your Fire Brigade to Use First Aid Extinguishers" by Walter Kidde & Company, 140 Cedar Street, New York.

—"Maintenance of First Aid Fire Fighting Equipment", American-LaFrance-Foamite Corporation, Elmira, New York.



two SIMPLICITY gyrating screens team up to speed basing operations in fertilizer production

Two Simplicity Gyrating Screens keep operations humming at this large Southern fertilizer plant. Working as a team, they handle the output of two 14" x 7" bucket elevators. A 3' x 8' Model "LS" Simplicity Single Deck Screen handles as much as 50 tons of super phosphate per hour; and a 3' x 6' Model "C" Simplicity Single Deck Screen handles all other fertilizer ingredients at about the same rate of speed. Both screens are set at 20° and rotate with the flow of materials. There is virtually no blinding, as the screen in the photo, which has not been brushed or cleaned, shows. The splendid performance of this Simplicity team is typical of the fine job Simplicity Screens are doing throughout the fertilizer industry. They can help speed up operations and increase production in your plant, too. Write us today for complete information.



118

- Sales representatives in all parts of the U. S. A.
- FOR CANADA: Canadian Bridge Engineering Co., Ltd., Walkerville, Ontario
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TRADE MARK REGISTERED

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McVickar

(Continued from page 53)

cotton yield was boosted 58 percent; oats, 17 percent; soybeans, 59 percent; and potatoes, 68 percent.

No one can deny that fertilizers have played an important role in bringing about this increased production. Of course, other advances have also taken place to make the farm more efficient. For example, corn harvests that required 10 weeks some years ago now will take about 2 weeks because of the modern pickers and elevators. Likewise, the dairy farmer who formerly milked 9 to 12 cows a day by hand can now care for 20 to 25 cows through the help of milking machines and other labor-saving equipment. All of these things and many others have helped to raise the standard of living in America to the highest ever known to mankind.

But back to my story on fertilizers. Let's see what has happend as far as fertilizers are concerned during these years that yields have been increasing. See figure 5.

In 1910 about 9 hired men were required to farm about 1,000 acres, or a total of 2,877,000 workers were required to farm the 306 million acres devoted to crops. Last year an average of only $6\frac{1}{2}$ hired workers were needed to farm 1,000 acres, and only 2,308,000 workers—500,000 less than in 1910—were required to harvest the increased crop acreage of 341 million acres. Not only were fewer hired workers required (giving the farmer a saving in cash) but also fewer family workers were needed. In 1910, 9,269,000 farm workers tilled the land, while in 1950 some 8,043,000 farm workers —1,200,000 less—produced the food and fiber needed by our tremendously increased population. The adoption of modern farming methods, including the ever-increasing use of fertilizer has reduced the farm labor force by 1,795,000 workers in 40 years. What's more, if we would put into practice on all farms our scientific know-how, the number of workers needed to feed and clothe our Nation could still be decreased; in fact, it probably could be cut in half.

An appalling situation which faces us is the steadily decreasing organic-matter content of most of our cultivated lands. Fortunately, however, it is within our power to reverse this downward trend and at the same time to continue to increase our yields. To accomplish the job, we must use, in addition to good rotations, liberal quantities of commercial fertilizers. There is no substitute for organic matter, often referred to as the life of the soil. If we are to increase, or even maintain, the organic-matter content of our soil we must use ever-increasing amounts of fertilizer along with other good farming methods. Let me give you the results of an experiment.

During a 15-year test of four clean-culture crops, five small grains, and six hay crops at the West Virginia Agricultural Experiment Station, five tons of fertilizer raised the total crop yields from 41,000 to 118,000 pounds per acre. But it also greatly increased the

organic-matter content of the soil, because of the much greater amount of roots and stubble that were left in and on the soil after the crops had been harvested. The increase in organic matter in the plow depth of soil amounted to 3,600 pounds for each ton of fertilizer applied. If the subsoil had been examined as well, several hundred additional pounds gain in organic matter would certainly have been shown. It seems safe to assume, therefore, that 1 ton of fertilizer, rightly used on land that needs it, can be made to add 2 tons of organic matter to the soil, even when all the crops are harvested and hauled away.

All that is needed to maintain the organic-matter content of the soil at a high level is to fertilize it liberally, lime it as required, and seed it down to sod crops from time to time. Thus, a corn, wheat and clover rotation can be made to meet all the requirements for adding soil-organic matter even if the corn stover, the wheat straw, and the clover hay are removed from the land. If part of these can be left on the land, or if they can be fed to livestock and returned as manure, so much the better.

Let's look at the amount of fertilizer used as contrasted with the quantity recommended by our agricultural experiment stations. This comparison is shown in figure 6.

1950 Actual Fertilizer Use in U. S. vs. Recommendations

Crop	Used LBS./A	Rec. LBS./A
Corn	113.3	244
Cotton	203.3	351
Wheat	50.0	101
Grasslands	21.5	158

Prepared by The National Fertilizer Assn.

Increasing amounts of plant food must be applied to our lands regardless of whether our Nation is producing a surplus or if inadequate supplies are produced. In time of surplus, when farmers are required to produce less, they should maintain the highest net profit per unit through efficient production. In achieving this goal, fertilizer is essential. Likewise, in emergencies, when farmers find it necessary to produce more with reduced labor and a minimum investment, fertilizers are essential. No matter what the economic situation, it is vital for the welfare of our country that we maintain the fertility of our land. Commercial fertilizer is the only way to do this economically.

Before closing just a word about the charges made by the disciples of the organic school that the use of chemical fertilizer is responsible for such diseases as heart ailments and cancer. The death rate in this country has steadily declined. In fact, all though there are many factors, such as advances in the medical profession, one could by following the "organic gardener" procedure say that the way to increase man's life span is to use more chemical fertilizer.

It is also interesting to note that the death rate due to heart disease and cancer is lowest in the States that use the most fertilizer. For example, Georgia—the number 1 fertilizer-using State—has the lowest death rate due either to heart

Nebraska. The annual fertilizer disease or cancer. Virginia, which ranks eighth in fertilizer use, also has a very low death rate due to these particular diseases. (Figure 7).

In summary, and I'll make it short, fertilizers today account for 25 to 30 percent of our total farm production. Fertilizers properly used may have to account, in the future, for 50 percent of our total production.

Meetings

(Continued from page 68)

dealers conference to be held at the University of Nebraska January 12-13 has listed prominent speakers, including Z. H. Beers, Middle West Soil Improvement Committee, and Dr. C. J. Chapman, University of Wisconsin.

* * *

Georgia. The annual meeting of the Georgia Plant Food Educational Society will be held in Athens, January 20 at 1 P.M. in Conner Hall, U of Ga. ending with a banquet held jointly with the Georgia Section, ASA. Among the speakers will be Jack Rutland, IM&C; Walter Brown, Georgia AES; D. W. Brooks, Georgia Cotton Producers; Dr. Karl D. Butler, Avco; Dr. Russell Coleman. The banquet address is to be by Dr. George D. Scarseth, American Farm Research Association.

The ASA section meeting will be held the next day.

* * *

Pennsylvania. The annual conference of fertilizer and lime salesmen will be held January 26-28 in Room 109 Agriculture Building at Penn State. It will be followed immediately by the annual seed conference, which will run until January 30.

SPRING-SEEDED CROP GOALS

Goals for 1953 calling for another year of balanced high farm production were announced today by Secretary of Agriculture Charles F. Brannan. If the goals are attained and livestock output is as large as expected, total agricultural production next year will equal or exceed the 1952 record. Total crop-land use under the 1953 goals program would be about the same as the 1952 figure of nearly 360 million acres.

To support a desirable production of livestock and livestock products and to rebuild reduced feed grain reserves, the goals program stresses increased output of feed grains, hay, and grass. Smaller production is recommended for cotton, wheat, and oilseeds.

"To aim at anything less than the very high production level of recent years would be foolhardy during a period of national emergency," Secretary Brannan said in commenting on the goals. "The demand for farm products during the year ahead is expected to remain high. Consumer incomes and expenditures will be higher than in 1952. Our population is increasing at the rate of more than $2\frac{1}{2}$ million a year. Food is essential —no other weapon in democracy's arsenal is more powerful.

"Farmers should recognize, however, that 'high' does not mean 'all-out' production of all commodities. More than ever, the 1953 goals will emphasize a sound balance in the crop-production pattern, which means more of some crops and less of others.

"Exports of some farm products in 1953-54 almost surely will be below those for recent years because of improved agricultural supplies in other countries and a shortage of dollar exchange. We should indeed be lacking in our duty to farmers and to the Nation if the farm production goals we recommend did not reflect this situation.

"As in other years, the goals program represents an attempt to inform farmers as completely as possible about foreseeable national needs for farm commodities and to help them plan ways and means of fulfilling those requirements, while protecting the farm plant's long-range production capacity through conservation farming. Department policy is to announce goals well in advance of the planting season, to permit farmers adequate time to plan for the needed production.

"Work by the Department and State Agricultural Mobilization Committees in arriving at the goals clearly indicates that larger feed reserves are urgent, as a measure of preparedness in the midst of unsettled conditions, as well as to protect farmers and the rest of the economy against the danger of a major crop failure.

"The importance of producing and making use of high-quality forages and increasing acreages and yields of pastures and hay crops is emphasized in the establishement of grasslands goals by counties this year for the first time. This work is already well under way, and by spring it is expected that virtually all counties will have established grassland goals. An effective grasslands program that is coordinated with provision for adequate feed grain reserves will provide farmers with a sound foundation for more stable long-rang production of meat,

(Continued on page 78)

CLASSIFIED ADVERTISING

POSITION WANTED: Superintendent or assistant. Over 23 years experience. Prefer location in either Georgia, Alabama or Mississippi. Box #18, c o Commercial Fertilizer, 75 Third St. N. W., Atlanta, Ga.

ATTRACTIVE opportunity for man experienced in the design and operation of mixed fertilizer and super phosphate plants for sales work with organization which designs and builds for the Fertilizer Industry. Send complete resume and availability to Box #30, c/o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

ENGINEER to work in a responsible position on the design of Fertilizer Plants for a Company which designs and builds for the Fertilizer Industry. Send complete resume and availability to Box #31, c/o Commercial Fertilizer, 75 Third St., N. W. Atlanta, Ga.

FOR SALE: ROTARY DRYERS FOR GRANULATION. 4-7′ x 60 and 3-6′ x 60′ Rotary Kilns. These make excellent heavy duty long life direct heat Rotary Dryers by installing lifting flights. Other Rotary Dryers in stock: 8′ x 54, 6′ x 42′, 5′ x 40′, 4 6″ x 35′, and 4′ x 30′. Send us your inquiries for Jaw, Gyratory and Roll Crushers, Ribbon and Drum Mixers, Pulverizers, Bucket Elevators, Hammer Mills, Vibrating Screens, Belt Conveyors. We buy your idle machinery. Our 35th year. CONSOLIDATED PRODUCTS COMPANY, INC., 14 PARK ROW, NEW YORK 38, N. Y.

WANTED: Salesmanager for independent fertilizer manufacturer. Must be experienced in fertilizer business and within age range of 35 to 45. Give full details as to background and experience; also education. Box #32, c/o Commercial Fertilizer, 75 Third St., N. W. Atlanta, Ga.

WANTED: Job as Superintendent of dry mixing or acidulating plant, four years experience as such, fifteen in fertilizer business. Box #33, c/o Commercial Fertilizer, 75 Third St., N. W. Atlanta, Ga.

WANTED: Old established company interested in young man for sales work contacting fertilizer manufacturers Southeastern territory. Experience in this field advantageous but not necessary. Must be free to travel. Furnish complete information and references, which will be treated in confidence. Address Box 123, c o Commercial Fertilizer, 75 Third St., N. W., Atlanta, Ga.

DONO PRESS, INC., CHARLOTTE, N. C.

Spring-Seeded

(Continued from page 76)

milk, and eggs. Just as important, it helps insure the continued fertility of our land.

"No change is proposed in the national or State acreage and production goals for wheat which were announced early in the summer. In many of the winter wheat States, particularly in the Southwest, large abandonment is indicated because of unfavorable growing conditions, and this is expected to result in a production below the goal level for those areas.

Southern Safety Meet Atlanta, March 1-3

The Fertilizer Section of the Southern Safety Conference, which meets March 1-3 in Atlanta, Georgia is presenting two programs. The one on Monday afternoon is an informal conference on plant safety for which fertilizer plants are asked to submit written questions on safety and fire protection.

OBITUARIES

Granville C. Boyce, a director of Valiant Fertilizer Laurel, Delaware, suddenly, December 27.

Fred J. Sievers, 73, former director U of Massachussetts graduate school and for 22 years head of the AES, suddenly at his Amherst home, December 26.

Ward Tuttle, 44, industrial relations superintendent of Southwest Potash Corp., Carlsbad, New Mexico, suddenly at his home, November 30.

Lester Lee Walters, 42, manager of the Mississippi Federated Co-op fertilizer plant, of pneumonia, December 12 in a Canton, Miss. hospital.

Dr. Herman B. Siems, director of research, Swift plant food division, November 22 while introducing the speakers at the National Joint Committee on Fertilizer Application. For many years he headed the NFA Plant Food Research Committee.

Clarence E. Shepard, 69, retired in 1945 from Connecticut AES after 36 years of service there, in New Haven hospital, December 7.

Walter Bernard Chandler, owner of Dixie Fertilizer Co., Bossier City, Louisiana, which he had recently purchased from Smith-Douglass December 5, while on a hunting trip.

Fred Carroll, Sr., 56, founder of Farmers Fertilizer Co., Cairo, Georgia, died December 25 after a long illness, in Tallahassee, Florida, his home.

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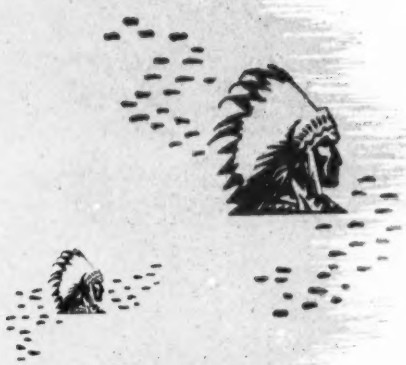

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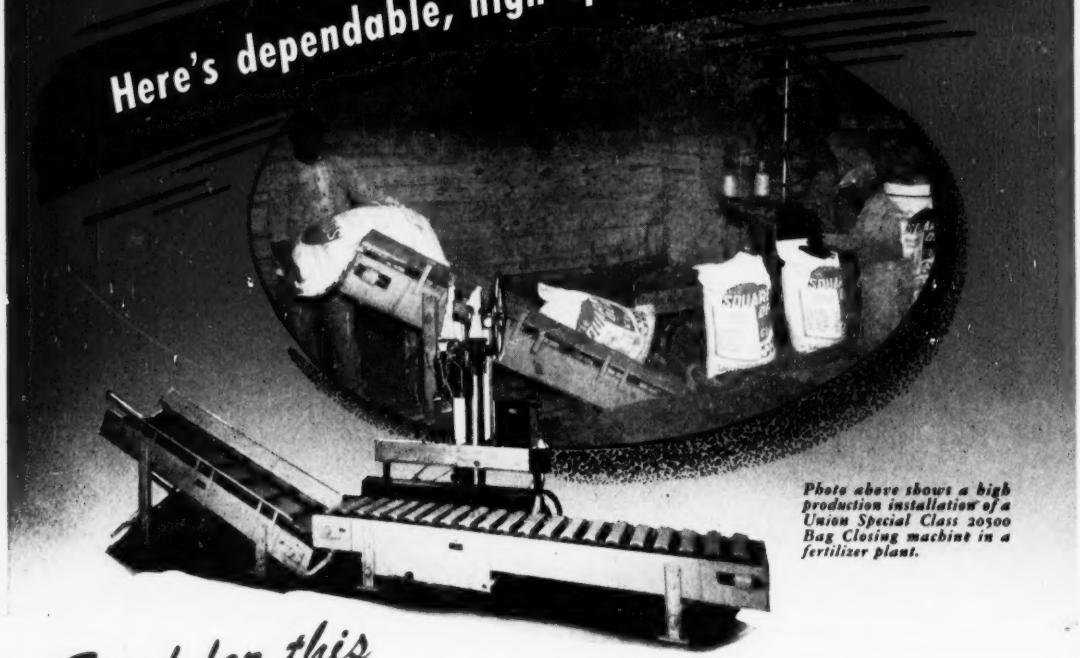

Photo above shows a high production installation of a Union Special Class 20500 Bag Closing machine in a fertilizer plant.

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